STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

PETITION OF INDIANA-AMERICAN WATER COMPANY, INC. FOR AUTHORITY TO INCREASE ITS RATES·AND CHARGES FOR WATER AND SEWER UTILITY SERVICE, FOR APPROVAL OF NEW SCHEDULES OF RATES AND CHARGES APPLICABLE THERETO, FOR APPROVAL OF CHANGES TO RULES AND REGULATIONS APPLICABLE TO SUCH SERVICE, AND FOR AUTHORIZATION TO DEFER IN A PENSION/OPEB BALANCING ACCOUNT OVER- AND UNDER-RECOVERIES FOR PASS THROUGH TO CUSTOMERS	)	**CAUSE NO. 43680**

PREFILED TESTIMONY

MAS REPORT 2
Vol. 3 of 3

VOLUME VII

THE INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

OCTOBER 27, 2009

Respectfully Submitted by

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Schumaker & Company

CMC

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Final Report

Volume III of III

Stratified Management & Operations Audit

of

Pennsylvania-American Water Company

for the

Pennsylvania Public Utility Commission
Bureau of Audits

Docket No. D-06MGT029

August 2008

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XII. Phase III – Water Operations – Distribution Business Systems

This chapter addresses a *Phase III* project in the water operations area and its impact on Pennsylvania-American Water Company (PAWC) operations.

A. Background & Perspective

In the 2000 management audit[1] of PAWC, several findings and recommendations were made in water operations that have yet to be fully implemented. They specifically include:

Prior Findings

1. A system-wide leak survey and repair database has not been developed.
2. A formal main replacement prioritization procedure needs to be developed.

Prior Recommendations

3. Develop an automated company-wide leak survey and repair database to be utilized with the recommended main replacement prioritization procedure.
4. Develop a formalized main replacement procedure based on weighted factors in order to systematically prioritize main replacement candidates on a state-wide basis.

It is Schumaker & Company's assessment that these findings and recommendations from the 2000 audit have not been completed. For whatever reason, each water district is responsible for implementing their own business processes for managing such common processes. The benefits of being a part of a larger organization that could provide the benefits of such common business processes have not been realized. Therefore, as part of Phase III of this audit, Schumaker & Company recommended that more investigation and guidance be provided in this area to ensure future implementation.

To their credit, PAWC has developed fairly detailed non-revenue water (NRW) and unaccounted-for-water (UFW) reporting processes that rely on an extensive set of spreadsheets. Although we are recommending that the technologies underlying that process be converted to a database in lieu of an Excel spreadsheet, that process does begin to provide some uniformity in the management and reporting of unaccounted-for-water. However, a leak tracking database is not part of that application.

[1] / Focused Management and Operations Audit of the Pennsylvania-American Water Company prepared by the Pennsylvania Utility Commission, Bureau of Audits, Management Audit Division, August 2000

The purpose of this work plan area was to:

- Perform an in-depth review of the existing leak tracking database, pavement cut database, and pump maintenance database, and the DataStream maintenance database envisioned to be used in production.
- Identify weighted factors to systematically prioritize main replacement candidates on a state-wide basis.
- Identify specific improvements to existing systems or new systems needed to implement a systematic main replacement program including, but not limited to:
  - Leak reporting, tracking, and repair
  - System mapping
  - Pipe tracking databases
  - Pavement resurfacing databases
  - Pipe pressure database – hydraulic modeling
- Compare the applicability of what the natural gas industry is using with regard to main replacement prioritization to the water industry.
- Develop a preliminary functional specification for potential computer systems needed to fulfill the requirements of the 2000 audit.
- Develop a report of findings and recommendations involving these best practices.
- Develop an implementation plan, in which activities, timeframes, resources, and responsible parties are identified.

B. Findings & Conclusions

This section discusses additional water operations findings, specifically distribution operations, based on a more detailed investigation into the status of the leak tracking and reporting database and also some recent PAWC changes since our earlier Phase I Diagnostic Review field work in September to November of 2007. It includes specific findings and conclusions developed during *Phase III* Focused Analysis of this audit. We have divided our findings into two groupings:

- *Current Status* – We have summarized our findings regarding the current state of leak tracking and reporting systems, computerized maintenance management systems (CMMS), and main replacement decision models that existed in the January to March 2008 timeframe.
- *Current Plans* – We developed a high-level overview of all the major business processes in distribution operations. Using that understanding, we developed findings regarding the course of action that PAWC should undertake in implementing a leak tracking and reporting system and other potential business systems that would improve PAWC internal business processes in distribution operations.

The list of business processes that were identified was restricted to the major business processes only in distribution operations and did not include field service technicians, meter reading personnel, and other field activities. Those areas have separate business processes that were beyond the scope of our Phase III investigations.

Current Status

Finding XII-1 There is no common leak tracking system used throughout PAWC.

There are currently three different Access databases in existence at PAWC, which are being used to varying degrees, for tracking leaks. These are three separate database "designs." We stress the word "design" in that, although each database tracks leak information, each "design" is different and incorporates alternate attributes and features based on the needs of the water district at the time it was developed. Some of these features have nothing to do with leaks. These database designs are:

- A Microsoft Access leak tracking database, which was developed by Wilkes-Barre/Scranton distribution operations personnel, is used for tracking leaks in the Wilkes-Barre/Scranton area. It has been in existence for five to six years. It is used specifically for leak reporting and tracking.
- A Microsoft Access leak tracking database, which was developed by Pittsburgh distribution operations personnel, is used for tracking leaks in the several water districts in Western PA, including Brownsville, Pittsburgh, McMurray, and others. It has been in existence for four to five years. It is used for leak reporting and tracking in addition to valve operation and some other unique items. Each water district has its own database file, so for all practical purposes we are actually talking about four to five separate databases running over a very slow network infrastructure.
- A Microsoft Access leak tracking database, which was developed by the Best Operating Practices group in November of 2007, is currently not used by any water district, but was envisioned to be used by other water districts (those which currently do not have a leak tracking database) to begin collecting leak information. It is also currently being used for designing a leak tracking and reporting capability into CMMS, discussed in *Finding XII-4*. However, there are currently no plans to migrate all of the leak information from the old databases into CMMS, again discussed in *Finding XII-4*.

Each of these databases is slightly different in design. Furthermore, each is the creation of a distribution operations person, not necessarily a trained database developer. Although the databases somewhat "get certain aspects of the job done," the databases are not well designed from an underlying technology standpoint (for instance, database naming conventions have not been consistently used in the designs) and would not be sufficiently flexible to integrate (electronically) with other current or future applications.

Finding XII-2 **None of the current Access databases are scalable for a state-wide or enterprise-wide application.**

Although Microsoft Access is a good application for developing small applications with a limited number of concurrent users, it is not a good application for building an enterprise-wide application. A more robust backend database product, such as Oracle or Microsoft SQL, needs to be deployed for such applications. Furthermore the use of Microsoft Access in the PAWC computer network environment is further degraded by the slow network infrastructure currently in place at PAWC, which we understand America Water is currently in the process of attempting to improve.

Finding XII-3 **Distribution operations personnel are very knowledgeable of their current leak tracking database.**

There is limited reporting from each of the leak tracking databases. Distribution operations personnel are knowledgeable regarding Microsoft Access and use it to write their own queries and develop reports, as needed, to pull and analyze the required information from their leak tracking databases. The fact that distribution operations personnel have the ability to query the Access database in various ways needs to be considered in any new design of a leak tracking database. If distribution operations personnel are not capable of writing their own queries against a new leak tracking database, it will require the development of a greater number of standard reports and the design of some form of query analysis capability into the new system. Furthermore, it will give rise to an even greater need for training of distribution operations personnel that might be involved in leak reporting and analysis.

Finding XII-4 **PAWC's current plans are to develop the leak tracking database as a part of CMMS; however, several key requirements may have been overlooked.**

PAWC has recently decided (March 2008) to incorporate the leak tracking database design put forth by the Best Operating Practices group into CMMS. Although CMMS appears to be a reasonable computerized maintenance management system, Schumaker & Company consultants have several reservations about the approach currently being undertaken, including:

- There is currently no consideration for uploading historical leak history from the various water districts into CMMS. In essence, PAWC will only have system-wide leak history information going forward after implementation of the CMMS database in 2008 (as prior historical information will only be available in Excel spreadsheets or Access databases). One of the primary purposes for developing a leak tracking and reporting database is to support various analyses of the condition of the distribution infrastructure. The more historical information that is available, the better the analyses.
- There has been insufficient consideration of "electronically" integrating the leak tracking databases with other leak-related business processes, as discussed in the analysis in subsequent findings contained in this report, specifically NRW tracking and reporting.

- There has been insufficient consideration of the underlying infrastructure requirements that might be required to integrate these business processes.
- There has been insufficient consideration of the distribution operations personnel efficiency and effectiveness improvements that might be possible from different approaches to the design – for instance the monthly unaccounted for water calculations could be automatically calculated and reported in the monthly NRW reports with little to no distribution operations personnel involvement.
- Up to this time, each leak tracking database has been separate and application security not necessarily given much thought as part of the design of any of the individual databases. Security was more a function of the file share (network security versus application security – i.e. there is no need to log into the current databases) on which the database was located. An enterprise-wide leak tracking and reporting system will require a more rigorous designed security plan. This has yet to be developed.

Finding XII-5 **The main replacement prioritization process that PAWC implemented in 2008 is a reasonable algorithm for prioritization and is similar to methods used in the natural gas industry; however, it has not been developed to the point of having automatic interfaces to PAWC performance reporting systems.**

America Water has recently developed for the 2008 budget year a main replacement prioritization model using Microsoft Excel that uses a pairwise (weighing various parameters against each other) comparison for prioritizing main replacement projects – once they have been identified as a project and the necessary information collected and loaded into the model. The algorithm used is similar to the model that we have seen used in the natural gas industry. Various relevant attributes of a segment of pipe and its leak history is factored into the calculations that are made.

However, collecting the data necessary to load the model can be a labor intensive process, in that there are no automatic interfaces to PAWC data sources. As a result of the labor involved, PAWC currently only analyzes selected main segments that have been identified by field personnel versus being able to automatically analyze all main segments on an ongoing basis.

Most natural gas companies are farther along in the implementation of main replacement and risk assessment programs in that they have built computer interfaces between their prioritization model and internal data sources, such as leak and pipe condition data to permit all pipe segments within their system to be analyzed and compared on an ongoing basis with minimal labor involved.

The U.S. Department of Transportation is promulgating regulations for the natural gas industry whereby all natural gas distribution companies have to be able to demonstrate the following:

- Know its infrastructure
- Identify system threats (leaks and breaks)

- Assess and quantify risk
- Proactively mitigate significant risk
- Measure, report, and improve performance

In fact, the gas distribution companies themselves came up with these basic elements for effective distribution system management. A water utility that is the size of PAWC and its parent company should actively strive to achieve similar objectives, as its makes good business sense without regulatory requirements.

PAWC uses the main replacement prioritization process to allocate capital on a district basis, not on a state-wide basis, which is suboptimal. PAWC's capital allocation for infrastructure improvements should be a system-wide process of comparative evaluation involving both risk and economic considerations. PAWC should monitor the entire state-wide network for changes in conditions (threats):

- New leaks, third-party locates, new buildings, constructions, etc.
- Constantly re-assess and monitor risk

A geographic information system (GIS) can be a very effective tool for accomplishing this objective, but it can also be done through a relational database.

Finding XII-6 The CMMS being implemented is a commercial product that allows significant user customization.

The CMMS currently being implemented by PAWC is a product called DataStream, which is owned by Infor. Infor acquired DataStream in early 2006. The CMMS is being hosted by Infor – i.e. it is not being run or supported on American Water computers or infrastructure, with the exception that the product is accessed over the American Water network facilities. The backend database is an Oracle database. The front end of CMMS permits users to perform a fair amount of customization of the interface and its capabilities without having to be a computer system developer or programmer. Users can create user defined fields for holding and reporting information and the CMMS application handles the necessary changes to the backend Oracle database to support the modified application.

The implementation of CMMS, in addition to being a relational database, is based on a customizable multi-organizational structure. This multi-organizational structure permits the information to be grouped and reported at various levels of consolidation. Essentially, the lowest level is a piece of equipment, the next level is the assignment of that piece of equipment to a plant, the next level up is the assignment of that plant to a water district, etc.

Therefore, the CMMS application can be implemented with very little American Water Works Service Company (AWWSC) Information Technology Services (ITS) Department support (which in fact is the case at PAWC), especially because it is not being hosted on America Water computer hardware. CMMS

is currently being piloted in the Glen Alsace water district. It is expected to be operational across PAWC in all water districts within the next two years (by the middle of 2010).

The DataStream CMMS has been implemented on the unregulated side of American Water for several years. Therefore, it is not an entirely new application to American Water. In addition, prior to the year 2000 (Y2k) issue, PAWC had an earlier version of DataStream implemented at many of its water production facilities. However, its use was discontinued at the time of Y2k. The DataStream software at that time was determined to not be compliant with issues associated with the date format change for the year 2000.

Planned Status

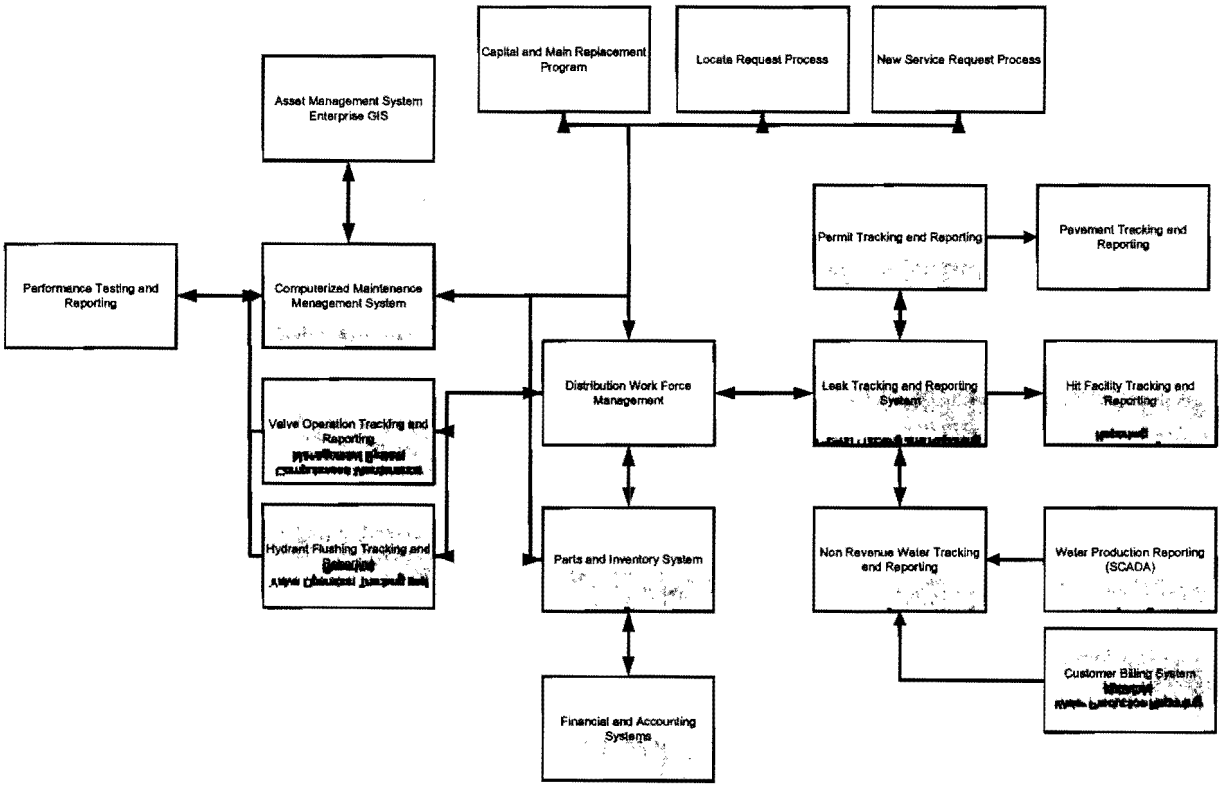
To provide a context in which to further investigate a leak tracking and reporting system, it was necessary as part of this work plan area to:

- Identify the major business processes that exist within distribution operations, which are provided at a high level in *Exhibit XII-1*.
- Identify the computer system(s) that might exist or could be developed to support these business processes, which are covered in the discussion of CMMS, enterprise GIS, and the proposed supporting performance reporting processes.
- Identify what interfaces might exist among these various business processes/computer systems, which are provided in the discussions of *Exhibit XII-2* through *Exhibit XII-5*.
- Identify the common data sources that might exist among these various business processes, which are discussed in the discussions of *Exhibit XII-2* through *Exhibit XII-5*.

A key factor of establishing the boundaries of a leak tracking and reporting system is the existence of common or related functionality and/or data sources that might dictate grouping more functionality into a larger and more comprehensive system rather than developing it as a standalone system.

The major business processes in distribution operations that were identified through our interviews are schematically illustrated in *Exhibit XII-1*. *Exhibit XII-1* provides a high-level representation of the major business processes that exist within the distribution (network) operations area of PAWC. In many cases, only manual systems exist to support these business processes and in other cases some form of computerized system has been developed (in several cases, each system being separately developed) to support the business processes. *Exhibit XII-1* is an attempt to identify all of the major operational business processes that exist at a high level, grouping them into related underlying information needs and identifying the interrelationships and boundaries that might exist that could be defined between each individual high-level business process.

Exhibit XII-1
Distribution Business Processes
as of March 31, 2008



Source: Interviews 175, 183,184,185,186, 187, 195, 196, and 202

The following briefly describe the individual groupings portrayed in *Exhibit XII-1.*

- *Asset Management System* – This business process revolves around the identification and management of individual equipment and facilities (assets) that require some form of operational management or oversight. Operational management implies some form of ongoing management of the asset, such as maintenance and testing throughout the life of the asset. This differs from a financial perspective, where financial management might only be concerned with applying the proper depreciation to the asset. From a technology standpoint the business process would involve that implementation of some sort of database (relational and/or geo-coded database) as its underlying technology. Depending on the nature of business operations, a computerized maintenance management system might serve the basis of an asset management system. In the case of PAWC, assets would include such items as pumps, valves, piping, instrumentation, physical plant facilities, etc.
- *Computerized Maintenance Management System* – This business process implements certain business rules regarding the ongoing preventive maintenance and corrective maintenance of existing

assets. The business process maintains a record (history) of all activities regarding an individual asset (piece of equipment or facility). This history is used to forecast maintenance requirements. In many cases the system contains a link to inventory and other maintenance resources (including people). The business process creates individual work orders or lists of actions required based on imbedded business rules.

- *Performance Testing and Reporting* – Some assets can be better "managed" if they are assigned an ongoing monitoring and testing program, which is a more precise predictor of a preventive or corrective action requirement. Usually not all equipment in a computerized maintenance management system would require this type of ongoing monitoring and, therefore, it might be a separate system. In essence only a subset of the equipment might be addressed with such a system. Very specialized business rules would be used to generate work orders or lists of corrective actions required.
- *Valve Operation Tracking and Reporting* – This business process is more of a testing process to ensure that the various manual and automatic valves within the system operate as needed and required. The intent is to find out if there might be a problem with a valve's operation before it is required to operate – such as in the event of the need to shut off supply due to a leak or some other need. In PAWC, Allegheny County has specific requirements relating to a valve testing program that PAWC must follow.
- *Hydrant Flushing Tracking and Reporting* – This business process is more of a testing process to ensure that the various hydrants within the system operate as needed and required. The intent is to find out if there might be a problem with a hydrant before it is required to operate. Robust tracking and reporting of hydrant inspections is very important from a liability standpoint. In the event of a malfunction during an emergency, an water utility needs to be able to back up claims of regular inspections and maintenance.
- *Locate Request Process* – This business process manages the assignment of locate requests to distribution field personnel. Because PAWC performs all of its own locate requests (as opposed to the use of outside contractors), there needs to be a business process for managing this effort.
- *New Service Request* – This business process manages the request for new services, specifically where a pre-existing service did not exist. PAWC has currently implemented a manual process for this business process.
- *Capital and Main Replacement Program* – This business process manages the identification and management of all distribution capital projects that are eventually implemented by distribution field operations.
- *Distribution Workforce Management* (Jobs, Resources, Assignments) – This is the business process for assigning and managing the work assigned to distribution field forces. It is currently primarily a paper system at PAWC. Other utilities have developed workforce management systems for assigning and managing distribution field forces. Much of a distribution field forces' work can be planned in advance. Larger utilities have central groups and systems for

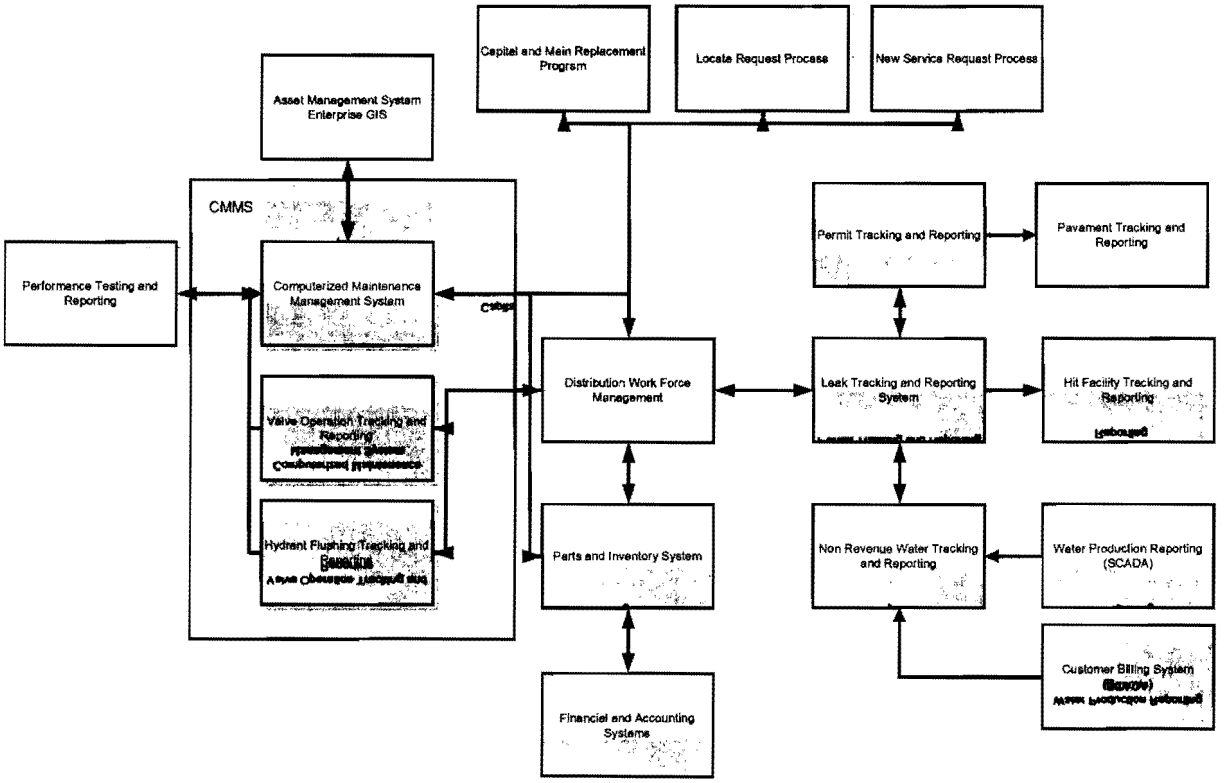
supporting this business process. Various other systems usually feed work orders into the system where various business rules are applied to schedule the work – such as different work orders being assigned priorities based on the nature of the work order. For instance, in distribution the type of work orders might be new main construction, new service installation, main replacement, leak investigation, leak repair, valve operations, hydrant flushing, leak detection, etc. Depending on the skills of the field forces and associated union rules, the field forces could be dispatched based on specific business rules.

- *Leak Tracking and Reporting System* – This business process collects and reports information on identified leaks in the system. There are two primary purposes for this information:
  - To provide historical information for making better decisions on future main replacement efforts
  - To take credit for "accounted for" leaks, such as leakage that occurs from the time a leak is identified until it is repaired, in the system that directly impact non-revenue water and unaccounted-for-water calculations.
- *Permit Tracking and Reporting* – This business process is related to construction and repair operations in the field where a permit is required for a particular activity – such as a pavement cut in a road. It manages the opening and closing of permits with various municipal and local governments.
- *Pavement Tracking and Reporting* – This business process is related to construction activities where the pavement needs to be removed, resulting in a temporary patch until a permanent patch can be performed. It also provides a historical record of all pavement cuts for liability purposes.
- *Hit Facility Tracking and Reporting* – In the event of a facility being damaged by a third-party, additional information needs to be collected for determining the party at faulty and potentially assessing damages.
- *Non Revenue Water Tracking and Reporting* – The business process surrounding the calculation of non revenue water and unaccounted for water involves many different inputs. This information needs to be available on a periodic and geographic basis, and calculated uniformly.
- *Water Production Reporting (SCADA)* – This in an information source for calculating non revenue water. The information needs to be available on a periodic and geographic basis, including smaller water control zones.
- *Customer Billing System Reporting* – This in an information source for calculating non revenue water. The information needs to be available on a periodic and geographic basis, including smaller water control zones.
- *Parts and Inventory System* – This business process ensures that materials are available to perform identified maintenance and repair activities and to carry out new construction activities.
- *Financial and Accounting Systems* – These systems are of a more financial than operational nature, although some interfaces to these systems might be necessary.

Finding XII-7 **Valve operation tracking and reporting and hydrant flushing tracking and reporting are being appropriately integrated into CMMS.**

The business processes that are being addressed with CMMS are illustrated in the CMMS box shown in *Exhibit XII-2*. As shown in *Exhibit XII-2*, valve operations and hydrant flushing are being implemented into CMMS using inspection routes – valves, pumps, and hydrants being assigned to specific inspection routes to minimize travel time. The history for all of these inspections will be available from CMMS.

Exhibit XII-2
Valve and Hydrant Asset Performance Distribution Business Processes
as of March 31, 2008



Source: Interviews 175, 183,184,185,186, 187, 195, 196, and 202

Finding XII-8 **Based on Schumaker & Company's review, it is not clear that CMMS will provide the work management capabilities needed for managing PAWC's distribution workforce.**

The CMMS is anticipated to also support distribution work management activities in the field. As shown in *Exhibit XII-3* and based on interviews with PAWC personnel, CMMS is also anticipated to be the primary workforce management tool used in distribution operations. While this may be possible on

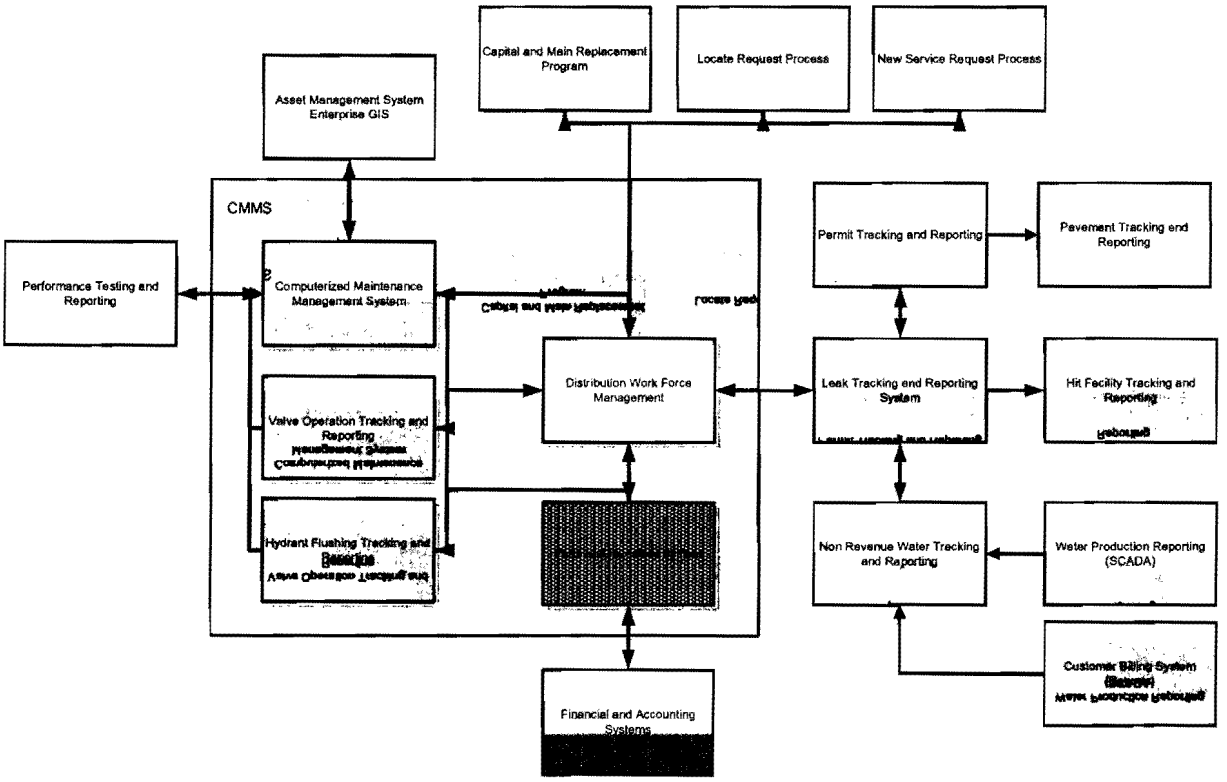
the production side, in our experience, more utilities have implemented separate work force management applications with interfaces to a CMMS-type application for managing distribution work. On the production side, most of the work is driven by the maintenance program, whereas on the distribution side there are a lot more drivers of the work such as new main construction, main replacement projects, locate requests, new service installations, etc.

Finding XII-9 **The parts and inventory portion of CMMS is not being fully implemented at this time.**

As shown in *Exhibit XII-3*, CMMS includes a parts and inventory module, which is not being implemented at this time. However, American Water personnel do have experience with CMMS parts and inventory in that it has been implemented at several places on the unregulated side.

The CMMS parts and inventory module should be considered for possible implementation to address some of our findings in *Chapter IV – Procurement and Materials Management.*

Exhibit XII-3
Workforce Management and Parts and Inventory Distribution Business Processes
as of March 31, 2008

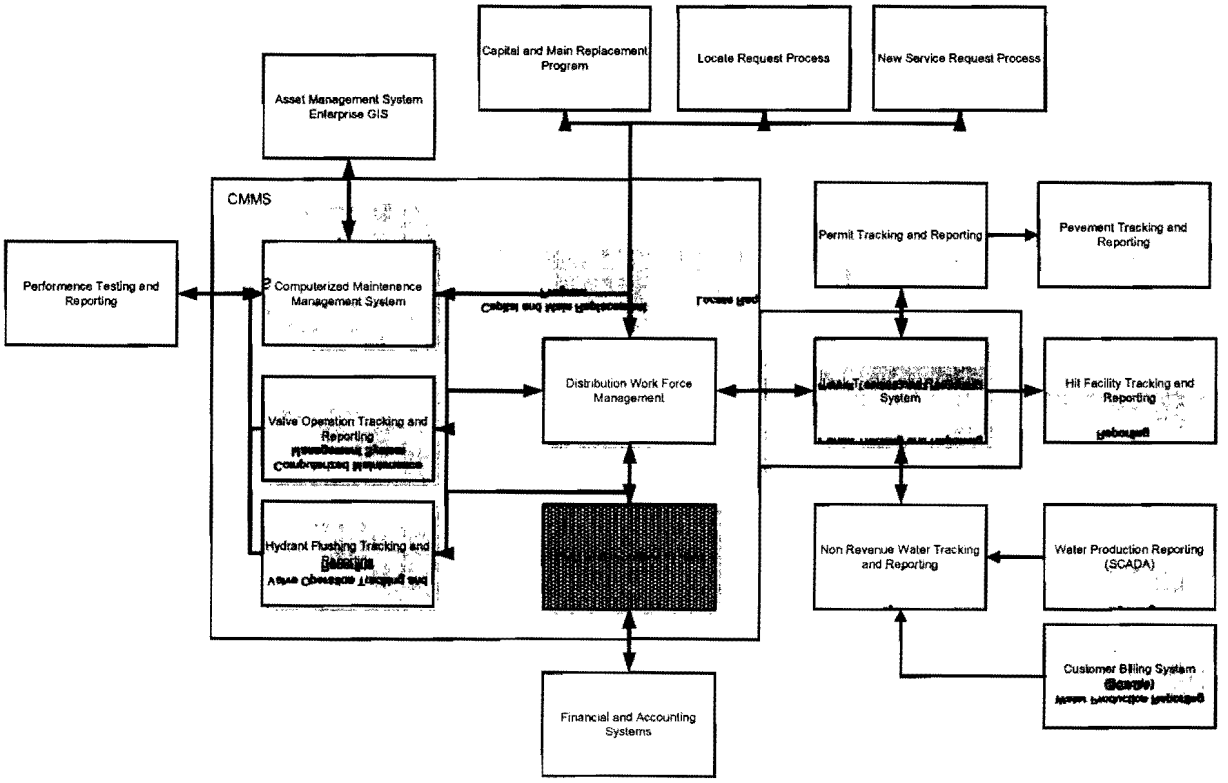


Source: Interviews 175, 183,184,185,186, 187, 195, 196, and 202

Finding XII-10 **Incorporating the leak tracking and reporting system into CMMS may not be the best approach.**

In addition to the concerns expressed in *Finding XII-4*, *Exhibit XII-4* illustrates that a leak tracking and reporting system would appear to tie into many other business processes that are not a part of CMMS. The leak tracking and reporting system is the repository for all of the leaks identified on a monthly basis that factor into the NRW and UAW calculations currently reported in the NRW tracking and reporting system. This system is currently a set of linked Excel spreadsheets, which need to be converted to a database, as discussed in *Chapter XI – Operational Performance.* In addition, leaks can be the drivers behind pavement cuts and hit facilities as well as the need for getting permits for cutting into streets and road facilities of the various jurisdictions in which PAWC operates.

Exhibit XII-4
Leak Tracking and Reporting Distribution Business Processes
as of March 31, 2008



Source: Interviews 175, 183,184,185,186, 187, 195, 196, and 202

Finding XII-11 **It may be more appropriate to integrate the leak tracking and reporting application with an enterprise GIS instead of CMMS.**

Within the gas industry, many gas utilities are integrating information from a leak tracking application with their enterprise GIS. The integration essentially involves linking information from the leak-tracking application via geo-code locations to be able to display the information on GIS maps. In addition, these geo-code locations are also used to assign leaks to pipe segments for the purpose of performing main replacement analyses.

Schumaker & Company consultants recognize that one could tie the leak tracking information to a CMMS. However, that would necessitate uniquely identifying all the pipe segments in the system (developing a unique numbering scheme for pipe segments) and then assigning all identified leaks to the specific pipe segments.

Enterprise GIS is currently under consideration for adoption at PAWC, pending the results achieved by a pilot program in New Jersey. In our experience, those utilities that have implemented enterprise GIS have typically chosen to integrate leak tracking with enterprise GIS.

Finding XII-12 **There are currently no plans to integrate the NRW tracking and reporting with the leak tracking and reporting databases nor are there plans to integrate pavement tracking and reporting, permit tracking and reporting, or hit facilities tracking and reporting with a leak tracking and reporting system.**

Schumaker & Company consultants recognize some interconnection among the business processes involving NRW tracking, pavement tracking, permit tracking, and hit facilities. In almost all cases, a leak is the initiating event. Therefore, to design a leak tracking and reporting application that integrates many of these other business processes would appear to result in greater efficiencies in these business processes within PAWC.

C. Recommendations

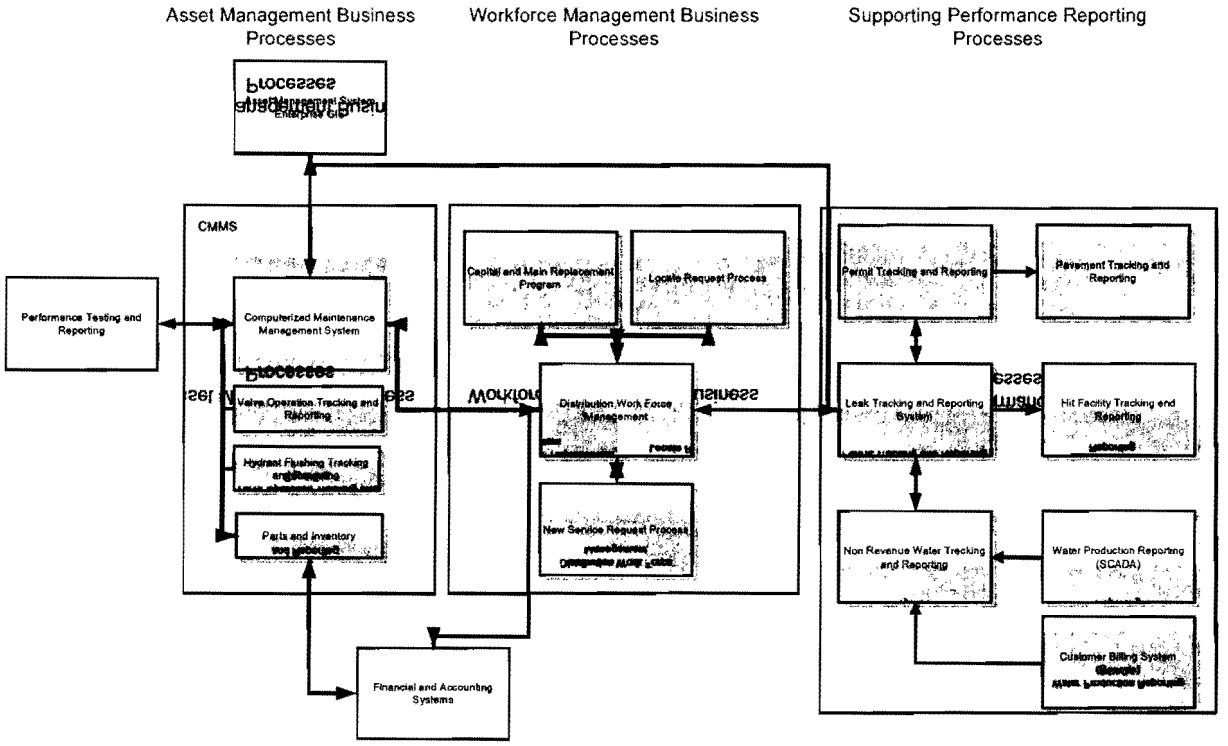
Recommendation XII-1 **Structure the design of business applications for the distribution operations function as shown in Exhibit XII-5. (Refer to Finding XII-1, Finding XII-2, Finding XII-3, Finding XII-4, and Finding XII-10)**

Having identified many of the major business processes within distribution operations and schematically displaying them on the exhibits contained in this report leads to the identification of three major groupings of related business processes. These groupings, which are shown in *Exhibit XII-5*, include:

- *Asset Management Business Processes* – Business processes associated with the operations, maintenance, testing, and inspections of equipment and faculties used in fulfilling PAWC's mission of delivering water and waste water services.
- *Workforce Management Business Processes* – Business processes associated with the management of field forces used in fulfilling the PAWC mission of delivering water and waste water services.
- *Supporting Performance Reporting Business Processes* – Other business processes necessary for managing other aspects of the water business, which provide statistical and other specific information used in fulfilling the PAWC mission of delivering water and waste water services.

In addition, the financial and accounting systems would also be considered another grouping of information systems; however, these systems were beyond the scope of this work plan area.

Exhibit XII-5
Recommended Distribution Business Processes Road Map
as of March 31, 2008



Source: Schumaker & Company Analysis

This grouping of major business processes provides a logical grouping in which the interfaces among the major groupings are minimal. For instance, the following major interfaces would exist:

- *Financial and Accounting System – Asset Management Systems* – primary interface would be parts and

inventory with CMMS and labor costing to the extent it is used for managing the workforce labor costs.

- *Asset Management – Workforce Management* – primary interface is via work orders generated by the CMMS to be performed in the field.
- *Workforce Management – Supporting Performance Reporting* – primary interface is work orders involving leaks that are handled in the field.
- *Asset Management – Supporting Performance Reporting* – primary interface is leaks that would be mapped on GIS.

Recommendation XII-2 **Develop the leak tracking and reporting database as a part of a larger, long-term effort to integrate with other supporting performance reporting business processes such as NRW, permits, pavement tracking, and hit facilities. (Refer to Finding XII-10 and Finding XII-12)**

As shown in *Exhibit XII-5*, there is more commonality of leak tracking and reporting to NRW, permits, pavement tracking, and hit facilities than there is between leak tracking and reporting with CMMS.

Recommendation XII-3 **Adopt the multi-organizational reporting structure (upon which CMMS is being implemented) across both the workforce management business process and supporting performance business processes. (Refer to Finding XII-6)**

One of the strengths of CMMS is the multi-organizational structure on which it is built. It would be beneficial for all other business systems to be based on the same multi-organizational structure.

Recommendation XII-4 **Engage AWWSC ITS to assist in the development of the supporting performance reporting process systems identified in Exhibit XII-5. (Refer to Finding XII-6)**

The water operations area had been attempting to implement CMMS without much assistance from the AWWSC ITS organization. Schumaker & Company consultants recognize that there have been some issues with ITS support in the past, due primarily to resource and skills availability; however, these issues are purportedly being addressed by ITS. Water operations management needs to meet with ITS management to obtain an agreement on the development of the supporting performance reporting processes identified in *Exhibit XII-5*. Either ITS needs to obtain the required staffing/resource skills to adequately support water operations needs or external resources should be considered for this applications development effort.

Recommendation XII-5 **Address the deficiencies in the current plans regarding the incorporation of leak tracking and reporting into the design of CMMS. (Refer to Finding XII-4)**

Although CMMS appears to be a reasonable computerized maintenance management system, Schumaker & Company consultants have several reservations about the approach currently being undertaken. These reservations include:

- There is currently no consideration for uploading historical leak history from the various water districts into CMMS.
- There has been insufficient consideration of "electronically" integrating the leak tracking databases with other leak related business processes.
- There has been insufficient consideration of the underlying infrastructure requirements that might be required to integrate these business processes.
- There has been insufficient consideration of the distribution operations personnel efficiency and effectiveness improvements that might be possible from different approaches to the design – for instance the monthly accounted for water calculations could be automatically calculated and reported in the monthly NRW reports with little to no distribution operations personnel involvement.
- Up to this time, each leak tracking database has been separate and application security not necessarily given much thought into the design of any of the individual databases. Security was more a function of the file share (network security versus application security – i.e. there is no need to log into the current databases) on which the database was located. An enterprise-wide leak tracking and reporting system will require a more rigorous designed security plan. This has yet to be developed.

Recommendation XII-6 **Consider integration of leak tracking and reporting with the eventual GIS system versus integration with CMMS. (Refer to Finding XII-5, Finding XII-10, and Finding XII-11)**

Based on our experience, this is the route that most gas utilities are adopting and would be the most beneficial approach for PAWC's implementation.

Recommendation XII-7 **Ensure that the leak history is migrated into the eventual leak tracking and reporting database from all existing databases with good data. (Refer to Finding XII-4)**

One of the primary purposes of a leak tracking and reporting system is to maintain a history of leak information that can be used for performing various analyses – the more history, the more information to consider in analyses.

Recommendation XII-8 Electronically connect leak and other records to the main prioritization model. (Refer to Finding XII-4)

Leaks and breaks in particular need to be associated to specific pipes in an automated manner. Two primary ways to accomplish this association are:

- As an interim process until a GIS is built and deployed, PAWC should use leak and break record data from databases to build pseudo mains to be maintained in the leak database by address range. Whenever a new leak comes in within the given address range, it should be added to the pseudo main project. Usually a leak record will have the following information:
  - Pipe material
  - Pipe size
  - Other attributes
- Implement a GIS with main attributes with geocoding of breaks and leaks to pipes.

The main prioritization model needs to be modified to be able to handle automated data acquisition. Other data sources besides leaks should also be considered, such as taste and odor complaints, non-revenue water data, etc.

Recommendation XII-9 Allocate infrastructure improvement budgets on a state-wide basis not just district by district. (Refer to Finding XII-5)

PAWC should begin using the main prioritization model to allocate infrastructure improvement capital dollars on a state-wide basis not just district by district. Key objectives should be:

- Provide an objective evaluation framework
  - Quantification and comparison between candidate projects
  - Improve organizational communication via a common understanding of high-priority projects and the underlying drivers
- Minimize risk and optimize resource allocations
  - Focus limited resources on riskiest pipes
  - Reduce operations and maintenance (O&M) dollars through economically justified investments

Recommendation XII-10 Consider the eventual implementation of the parts and inventory component of CMMS. (Refer to Finding XII-9)

The parts and inventory system that is a part of CMMS already has interfaces to the maintenance management capabilities that CMMS designed into it. Schumaker & Company recognizes that PAWC is currently using an enterprise resource planning (ERP) system from JD Edwards, which American Water

may upgrade or replace. Schumaker & Company consultants have made several recommendations regarding materials management in *Chapter IV – Support Services*. Because CMMS already contains an inventory module, there are two things that should be considered and evaluated.

- Adopt the CMMS inventory module and use it to generate requisitions to the ERP system, which results in purchase orders for replenishment based on business rules in CMMS.
- Adopt the CMMS inventory module and synchronize the inventories with the ERP system using the ERP business rules to generate purchase orders.

Recommendation XII-11 Recognize that a more robust distribution workforce management application may eventually be required to support future business processes. (Refer to Finding XII-8)

Many utilities have developed separate workforce management systems to support field operations. A CMMS-type application would be but one of the applications that would "feed' work orders into the workforce management system for field operations. Water operations management's current plan is to use the existing CMMS to perform this business process. PAWC should continue to monitor how well CMMS helps it to manage its workforce. If CMMS is found to be inadequate, then PAWC should more fully develop the workforce management portion of CMMS.

Schumaker & Company consultants recognize that PAWC is convinced that the CMMS system has the capability to host a work order/workforce management system, and will continue to explore this possibility. Potentially, distribution operations work orders can be created in the CMMS and communicated and scheduled/managed through the Advantex system. The Company does not completely agree with the consultants assertion that "much of a distribution field forces' work can be planned in advance," particularly in the smaller districts. Poor weather, main breaks, emergency locate requests, water quality issues and collections efforts, for example, can all disrupt a planned work day. Some flexibility will always be required in whatever system the Company ultimately chooses. The Company currently views anything outside of CMMS and Advantex as potentially adding another layer of complexity to the process.

D. Overall Summary Conclusions

While Schumaker & Company consultants are impressed with the capabilities of the proposed CMMS and fully endorse its implementation for plant and facilities maintenance management and the scheduling and management of periodic inspections such as hydrant flushing, valve operations, etc.; we have real concerns if it is the appropriate tool for implementing leak tracking. Our concerns revolve around the following issues.

- CMMS is a third-party product that permits a fair amount of user customization. While on the surface that may appear to be good, its very design makes it more difficult for a developer or

programmer interested in electronically integrating information contained in the system with other business processes or systems. We recognize that given enough money and time anything can be done, but is that the best route to take?

- With the exception of the multi-organizational structure of CMMS, there is little commonality in
the underlying data between leak tracking and maintenance management. In fact, the review of the
various business processes discussed above (shown above in *Exhibit XII-5*) builds a stronger case for building a separate group of computer technologies that support not only leak tracking but also:
  - NRW and UAW management and reporting
  - Pavement cut management and reporting
  - Permit tracking and reporting
- There are no plans to load historical information into CMMS. Although the argument has been made that the information in the Microsoft Access database will still be available, that would require operations personnel to consult two different systems when attempting to perform a 10-year analysis. Furthermore, if the leak tracking database is being developed to support all of American Water similar to the CMMS, the decision not to migrate historical data is putting the effort in the position of telling Kentucky-American Water Company, Tennessee-American Water Company, or other American Water systems that they have to agree to maintain their old data on their old system. We believe that this would be a serious impediment to state-wide adoption.
- The inability to accommodate historical information is due largely to the fact that CMMS apparently does not support loading historical data into the system.
- In the long run, PAWC will probably want to have the ability to show leaks on a GIS system map. Electronically linking leak information from CMMS into a GIS will be much a harder that in a more straight-forward database that was custom developed, primarily due to the underlying data structure.
- In the long run, PAWC will want to electronically pull leak information into its main replacement model. Electronically linking leak information from CMMS into a main replacement model will be much a harder that in a more straight-forward database that was custom developed, primarily due to the underlying data structure.
- A leak tracking database is not an overly complicated system. In fact the various Microsoft Access databases that are currently used were developed by non-technical personnel in operations who have the benefit of a Microsoft Access course and the desire to make leak tracking a better process. With a few significant exceptions, the rough database design could be used as a starting point for developing a new application. The significant exceptions include:
  - The main leak information table was not defined in the design.

- A security model was not developed as a part of the design – i.e. user rights etc.
- The multi-organizational structure proposed needs to be reviewed to make sure it is consistent with CMMS.

- A leak tracking database should be the type of application that could be developed internally by American Water. While we recognize that in the past the AWWSC ITS Department has not been able to provide the support requirements for water operations due to various reasons, it would be a good test of their capabilities.

In summary, this document should be shared with the AWWSC ITS Department, and the department should be solicited to support this effort.

E. Implementation Plan

This section provides a preliminary implementation plan for the development of a leak tracking database and also computerizing the NRW and UAW monitoring and reporting systems (linked spreadsheets as currently developed). Once these business applications are successfully implemented, they would provide a strong technology base for moving forward with the integration of pavement cut management and reporting, permit tracking and reporting, the integration of leaks with an eventual GIS and other future systems.

The implementation plan included in *Exhibit XII-6* (project resource estimates), *Exhibit XII-7* (project plan and schedule), and *Exhibit XII-8* (project cost estimates) was created in Microsoft Project. The entire Microsoft Project file is available as an attachment and viewable, if one has Microsoft Project available.

Assumptions

This implementation plan assumes that the leak tracking database would be developed with its systems architecture based on a Microsoft SQL Server back end and a .NET front end, such that it would operate in a web browser over the Internet or an Intranet. A Microsoft Access front end would be provided to operations personnel for querying (viewing and reporting only) the back-end SQL Server database. This type of systems architecture would minimize the need to develop specific reports as a part of this project. The initial design does not assume any mobile deployment. If deployed to mobile devices, Citrix would be the quickest and easiest platform. This architecture design is not necessarily the recommended design, but one that Schumaker & Company technology consultants are very familiar with from past projects and also the design used when creating the project plan.

Project Staffing

This implementation plan assumes the resources and costs (using assumed billing rates that estimate an average between in-house and outsourced resources) shown in *Exhibit XII-6*.

Exhibit XII-6
Project Resource Estimates

ID		Resource Name	Type	Initials	Max. Units	Std. Rate	Accrue At	Base Calendar
1		Project Manager	Work	PM	100%	$125.00/hr	Prorated	Standard
2		Senior Developer	Work	SD	100%	$105.00/hr	Prorated	Standard
3		Developer 1	Work	D1	100%	$85.00/hr	Prorated	Standard
4		Developer 2	Work	D2	100%	$85.00/hr	Prorated	Standard
5		Documentation Specialist	Work	DS	100%	$55.00/hr	Prorated	Standard

Source: Schumaker & Company Analysis

Project Plan

The project plan is based on beginning the development of the leak tracking database followed by the development of the NRW reporting database, although these items could be worked concurrently. The major tasks are briefly discussed below:

- *System Design* – A method for adopting the multi-organization structure in CMMS would be designed and developed for the leak tracking database and other subsequent databases discussed below. The actual data tables required for the application would be created using proper naming conventions. A security model would be developed that would involve the development of a rights table, user list, groups, group rights etc. An initial entry and editing form would be prototyped.
- *System Development* –The system design would be developed into a prototype application for demonstration and testing.
- *Data Conversion* – This major task would involve the loading of the leak information already contained in the Wilkes-Barre and Pittsburgh databases into the new application for testing purposes. Operations personnel familiar with their current Access leak tracking database would test the data entry and editing interface that had been developed to date. We suggest that users be provided with an Access front end for querying the information in the back-end database to begin to provide them with an idea of what could be done and perhaps what reports might be beneficial.
- *System Pilot Testing* – The prototype would be tested by operations personnel using a copy of their current leak data.

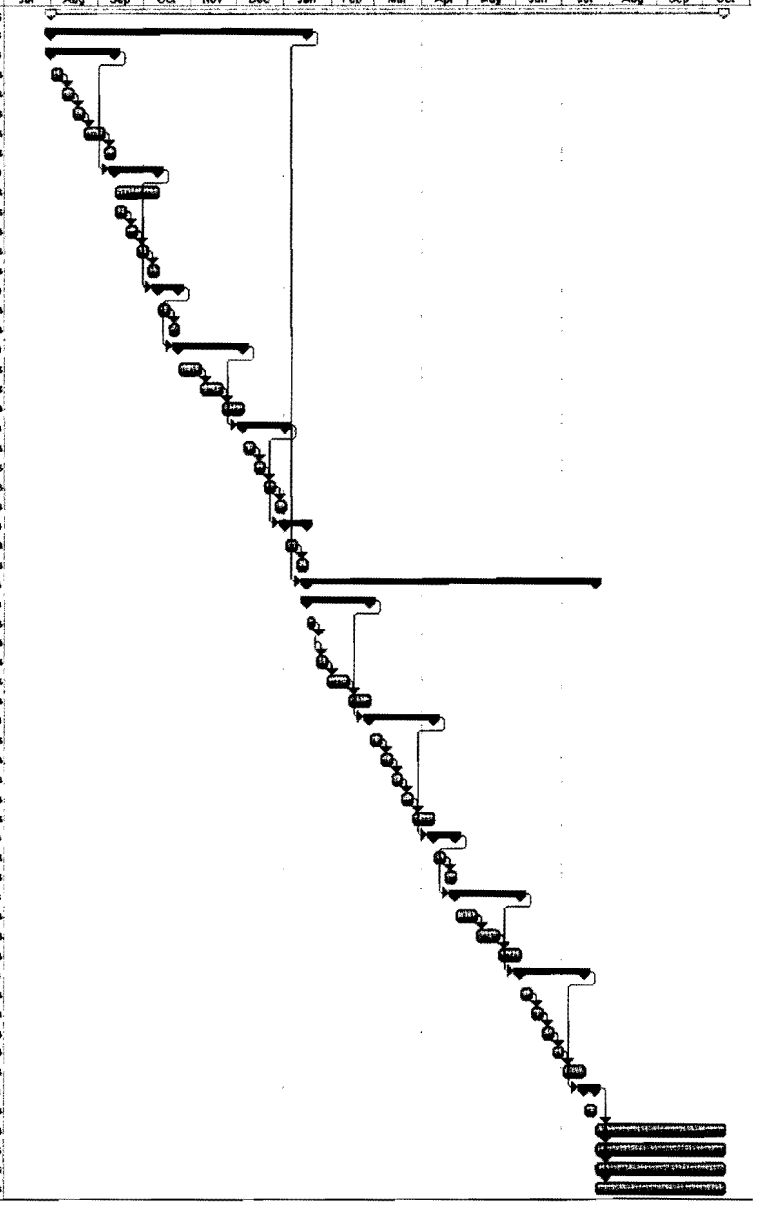
- *System Redevelopment* – Bug fixes resulting from the initial testing would be incorporated into the system and potential enhancements identified and prioritized. A decision would be made on the ability to put the application into the production environment.
- *Ongoing Development and Production* – Subsequently development, preproduction, and production environments would be created for continuing development of the leak tracking database and other applications, as necessary.

Project Schedule

This implementation plan includes the schedule shown in *Exhibit XII-7*

Exhibit XII-7
Project Plan and Schedule

ID	WBS	Task Name	Duration
0	0	**Leak Tracking and NRW and UAW Reporting**	**314 days**
1	1	**Leak Tracking Database Design and Development**	**120 days**
2	1.1	**System Design**	**30 days**
3	1.1.1	Multi - Organizational Structure Design	5 days
4	1.1.2	System Security and Profile Development	5 days
5	1.1.3	Leak Tracking Data Structure Design	5 days
6	1.1.4	Web-based Data Entry Forms - Entry and Edit	10 days
7	1.1.5	System Architecture Design	5 days
8	1.2	**System Development**	**20 days**
9	1.2.1	Implement System Architecture	20 days
10	1.2.2	Multi - Organizational Structure Development	5 days
11	1.2.3	System Security and Profile Development	5 days
12	1.2.4	Leak Tracking Data Structure Design	5 days
13	1.2.5	Web-based Data Entry Forms - Entry and Edit	5 days
14	1.3	**Data Conversion**	**10 days**
15	1.3.1	Wilkes-Barre	5 days
16	1.3.2	Pittsburgh	5 days
17	1.4	**System Pilot Testing**	**30 days**
18	1.4.1	Data Entry/Editing	10 days
19	1.4.2	System Security and Profile	10 days
20	1.4.3	Test Data Access Via Microsoft Access and Exce	10 days
21	1.5	**System ReDevelopment**	**20 days**
22	1.5.1	Multi - Organizational Structure Design	5 days
23	1.5.2	System Security and Profile Development	5 days
24	1.5.3	Leak Tracking Data Structure Design	5 days
25	1.5.4	Web-based Data Entry Forms - Entry and Edit	5 days
26	1.6	**Ongoing Development and Production Environm**	**10 days**
27	1.6.1	Create Development, Preproduction and Productio	5 days
28	1.6.2	1st Rollout to Production	5 days
29	2	**NRW and UAW Reporting Database Design and Develo**	**134 days**
30	2.1	**System Design**	**29 days**
31	2.1.1	Multi - Organizational Structure Design	2 days
32	2.1.2	System Security and Profile Development	2 days
33	2.1.3	Accounted for Water and Other Information	5 days
34	2.1.4	Web-based Data Entry Forms - Entry and Edit	10 days
35	2.1.5	Standard Reports	10 days
36	2.2	**System Development**	**30 days**
37	2.2.1	Multi - Organizational Structure Development	5 days
38	2.2.2	System Security and Profile Development	5 days
39	2.2.3	Accounted for Water and Other Information	5 days
40	2.2.4	Web-based Data Entry Forms - Entry and Edit	5 days
41	2.2.5	Standard NRW Reports	10 days
42	2.3	**Data Conversion**	**10 days**
43	2.3.1	Wilkes-Barre	5 days
44	2.3.2	Pittsburgh	5 days
45	2.4	**System Pilot Testing**	**30 days**
46	2.4.1	Data Entry/Editing	10 days
47	2.4.2	System Security and profile	10 days
48	2.4.3	Reported Results	10 days
49	2.5	**System ReDevelopment**	**30 days**
50	2.5.1	Multi - Organizational Structure Design	5 days
51	2.5.2	System Security and Profile Development	5 days
52	2.5.3	Accounted for Water and Other Information	5 days
53	2.5.4	Web-based Data Entry Forms - Entry and Edit	5 days
54	2.5.5	Standard NRW Reports	10 days
55	2.6	**Ongoing Development and Production Environm**	**5 days**
56	2.6.1	1st Rollout to Production	5 days
57	3	Pavement Tracking Database Development	3 mons
58	4	Hit Facility Tracking and Reporting	3 mons
59	5	Permit Tracking and Reporting	3 mons
60	6	Leak Reporting Integration with GIS	3 mons



Source: Schumaker & Company Analysis

Project Costs Estimates

The cost estimates are shown in *Exhibit XII-8.*

Exhibit XII-8
Project Cost Estimate
Page 1 of 2

ID	WBS	Task Name	Work	Cost	Details	2nd Half			1st Half		2nd Half
						Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
0	0	**Leak Tracking and HRW and UAW Reporting**	**5,526.8 hrs**	**$533,126.00**	Work		1,144h	1,181.2h	1,771.2h	1,068.4h	362h
1	1	**Leak Tracking Database Design and Development**	**2,587.2 hrs**	**$249,832.00**	Work		1,144h	1,181.2h	262h		
2	1.1	**System Design**	**780 hrs**	**$78,000.00**	Work		780h				
		Project Manager	*240 hrs*	*$30,000.00*	Work		240h				
		Senior Developer	*240 hrs*	*$25,200.00*	Work		240h				
		Developer 1	*240 hrs*	*$20,400.00*	Work		240h				
		Documentation Specialist	*60 hrs*	*$3,300.00*	Work		60h				
3	1.1.1	Multi - Organizational Structure Design	0 hrs	$0.00	Work						
4	1.1.2	System Security and Profile Development	0 hrs	$0.00	Work						
5	1.1.3	Leak Tracking Data Structure Design	0 hrs	$0.00	Work						
6	1.1.4	Web-based Data Entry Forms - Entry and Edit	0 hrs	$0.00	Work						
7	1.1.5	System Architecture Design	0 hrs	$0.00	Work						
8	1.2	**System Development**	**560 hrs**	**$54,400.00**	Work		364h	196h			
		Project Manager	*120 hrs*	*$15,000.00*	Work		78h	42h			
		Senior Developer	*160 hrs*	*$16,800.00*	Work		104h	56h			
		Developer 1	*80 hrs*	*$6,800.00*	Work		52h	28h			
		Developer 2	*160 hrs*	*$13,600.00*	Work		104h	56h			
		Documentation Specialist	*40 hrs*	*$2,200.00*	Work		26h	14h			
9	1.2.1	Implement System Architecture	0 hrs	$0.00	Work						
10	1.2.2	Multi - Organizational Structure Development	0 hrs	$0.00	Work						
11	1.2.3	System Security and Profile Development	0 hrs	$0.00	Work						
12	1.2.4	Leak Tracking Data Structure Design	0 hrs	$0.00	Work						
13	1.2.5	Web-based Data Entry Forms - Entry and Edit	0 hrs	$0.00	Work						
14	1.3	**Data Conversion**	**208 hrs**	**$17,800.00**	Work			208h			
		Project Manager	*8 hrs*	*$1,000.00*	Work			8h			
		Senior Developer	*20 hrs*	*$2,100.00*	Work			20h			
		Developer 1	*80 hrs*	*$6,800.00*	Work			80h			
		Developer 2	*80 hrs*	*$6,800.00*	Work			80h			
		Documentation Specialist	*20 hrs*	*$1,100.00*	Work			20h			
15	1.3.1	Wilkes-Barre	0 hrs	$0.00	Work						
16	1.3.2	Pittsburgh	0 hrs	$0.00	Work						
17	1.4	**System Pilot Testing**	**359.2 hrs**	**$34,132.00**	Work			359.2h			
		Project Manager	*80 hrs*	*$10,000.00*	Work			80h			
		Senior Developer	*80 hrs*	*$8,400.00*	Work			80h			
		Developer 1	*80 hrs*	*$6,800.00*	Work			80h			
		Developer 2	*79.2 hrs*	*$6,732.00*	Work			79.2h			
		Documentation Specialist	*40 hrs*	*$2,200.00*	Work			40h			
18	1.4.1	Data Entry/Editing	0 hrs	$0.00	Work						
19	1.4.2	System Security and Profile	0 hrs	$0.00	Work						
20	1.4.3	Test Data Access Via Microsoft Access and Ex	0 hrs	$0.00	Work						
21	1.5	**System ReDevelopment**	**440 hrs**	**$42,600.00**	Work			418h	22h		
		Project Manager	*80 hrs*	*$10,000.00*	Work			76h	4h		
		Senior Developer	*160 hrs*	*$16,800.00*	Work			152h	8h		
		Developer 1	*80 hrs*	*$6,800.00*	Work			76h	4h		
		Developer 2	*80 hrs*	*$6,800.00*	Work			76h	4h		
		Documentation Specialist	*40 hrs*	*$2,200.00*	Work			38h	2h		
22	1.5.1	Multi - Organizational Structure Design	0 hrs	$0.00	Work						
23	1.5.2	System Security and Profile Development	0 hrs	$0.00	Work						
24	1.5.3	Leak Tracking Data Structure Design	0 hrs	$0.00	Work						
25	1.5.4	Web-based Data Entry Forms - Entry and Edit	0 hrs	$0.00	Work						
26	1.6	**Ongoing Development and Production Environ**	**240 hrs**	**$21,200.00**	Work				240h		
		Project Manager	*40 hrs*	*$5,000.00*	Work				40h		
		Senior Developer	*80 hrs*	*$8,400.00*	Work				80h		
		Developer 1	*20 hrs*	*$1,700.00*	Work				20h		
		Developer 2	*20 hrs*	*$1,700.00*	Work				20h		
		Documentation Specialist	*80 hrs*	*$4,400.00*	Work				80h		
27	1.6.1	Create Development, Preproduction and Product	0 hrs	$0.00	Work						
28	1.6.2	1st Rollout to Production	0 hrs	$0.00	Work						

Source: Schumaker & Company Analysis

Exhibit XII-8
Project Cost Estimate
Page 2 of 2

ID	WBS	Task Name	Work	Cost	Details	2nd Half		1st Half		2nd Half
						Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
29	2	**NRW and UAW Reporting Database Design and Deve**	**2,939.6 hrs**	**$264,894.00**	Work			1,509.2h	1,068.4h	362h
30	2.1	**System Design**	**754 hrs**	**$76,278.00**	Work			754h		
		Project Manager	*232 hrs*	*$29,000.00*	Work			232h		
		Senior Developer	*232 hrs*	*$24,360.00*	Work			232h		
		Developer 1	*232 hrs*	*$19,720.00*	Work			232h		
		Documentation Specialist	*58 hrs*	*$3,190.00*	Work			58h		
31	2.1.1	Multi - Organizational Structure Design	0 hrs	$0.00	Work					
32	2.1.2	System Security and Profile Development	0 hrs	$0.00	Work					
33	2.1.3	Accounted for Water and Other Information	0 hrs	$0.00	Work					
34	2.1.4	Web-based Data Entry Forms - Entry and Edit	0 hrs	$0.00	Work					
35	2.1.5	Standard Reports	0 hrs	$0.00	Work					
36	2.2	**System Development**	**1,048 hrs**	**$99,488.00**	Work			755.2h	292.8h	
		Project Manager	*180 hrs*	*$22,500.00*	Work			144h	36h	
		Senior Developer	*240 hrs*	*$25,200.00*	Work			192h	48h	
		Developer 1	*120 hrs*	*$10,200.00*	Work			96h	24h	
		Developer 2	*240 hrs*	*$20,400.00*	Work			192h	48h	
		Documentation Specialist	*60 hrs*	*$3,300.00*	Work			48h	12h	
37	2.2.1	Multi - Organizational Structure Development	0 hrs	$0.00	Work					
38	2.2.2	System Security and Profile Development	0 hrs	$0.00	Work					
39	2.2.3	Accounted for Water and Other Information	0 hrs	$0.00	Work					
40	2.2.4	Web-based Data Entry Forms - Entry and Edit	0 hrs	$0.00	Work					
41	2.2.5	Standard NRW Reports	208 hrs	$17,800.00	Work			83.2h	124.8h	
		Project Manager	*8 hrs*	*$1,000.00*	Work			3.2h	4.8h	
		Senior Developer	*20 hrs*	*$2,100.00*	Work			8h	12h	
		Developer 1	*80 hrs*	*$6,800.00*	Work			32h	48h	
		Developer 2	*80 hrs*	*$6,800.00*	Work			32h	48h	
		Documentation Specialist	*20 hrs*	*$1,100.00*	Work			8h	12h	
42	2.3	**Data Conversion**	**0 hrs**	**$0.00**	Work					
43	2.3.1	Wilkes-Barre	0 hrs	$0.00	Work					
44	2.3.2	Pittsburgh	0 hrs	$0.00	Work					
45	2.4	**System Pilot Testing**	**357.6 hrs**	**$33,924.00**	Work				357.6h	
		Project Manager	*79.2 hrs*	*$9,900.00*	Work				79.2h	
		Senior Developer	*79.2 hrs*	*$8,316.00*	Work				79.2h	
		Developer 1	*79.2 hrs*	*$6,732.00*	Work				79.2h	
		Developer 2	*79.2 hrs*	*$6,732.00*	Work				79.2h	
		Documentation Specialist	*40.8 hrs*	*$2,244.00*	Work				40.8h	
46	2.4.1	Data Entry/Editing	0 hrs	$0.00	Work					
47	2.4.2	System Security and profile	0 hrs	$0.00	Work					
48	2.4.3	Reported Results	0 hrs	$0.00	Work					
49	2.5	**System ReDevelopment**	**660 hrs**	**$63,900.00**	Work				418h	242h
		Project Manager	*120 hrs*	*$15,000.00*	Work				76h	44h
		Senior Developer	*240 hrs*	*$25,200.00*	Work				152h	88h
		Developer 1	*120 hrs*	*$10,200.00*	Work				76h	44h
		Developer 2	*120 hrs*	*$10,200.00*	Work				76h	44h
		Documentation Specialist	*60 hrs*	*$3,300.00*	Work				38h	22h
50	2.5.1	Multi - Organizational Structure Design	0 hrs	$0.00	Work					
51	2.5.2	System Security and Profile Development	0 hrs	$0.00	Work					
52	2.5.3	Accounted for Water and Other Information	0 hrs	$0.00	Work					
53	2.5.4	Web-based Data Entry Forms - Entry and Edit	0 hrs	$0.00	Work					
54	2.5.5	Standard NRW Reports	0 hrs	$0.00	Work					
55	2.6	**Ongoing Development and Production Environ**	**120 hrs**	**$10,680.00**	Work					120h
		Project Manager	*20 hrs*	*$2,500.00*	Work					20h
		Senior Developer	*40 hrs*	*$4,200.00*	Work					40h
		Developer 1	*10 hrs*	*$850.00*	Work					10h
		Developer 2	*10 hrs*	*$850.00*	Work					10h
		Documentation Specialist	*40 hrs*	*$2,200.00*	Work					40h
56	2.6.1	1st Rollout to Production	0 hrs	$0.00	Work					
57	3	Pavement Tracking Database Development	0 hrs	$0.00	Work					
58	4	Hit Facility Tracking and Reporting	0 hrs	$0.00	Work					
59	5	Permit Tracking and Reporting	0 hrs	$0.00	Work					
60	6	Leak Reporting Integration with GIS	0 hrs	$0.00	Work					

Source: Schumaker & Company Analysis

XIII. Phase III Human Resources

This chapter addresses a *Phase III* project in the Human Resources (HR) area and its impact on Pennsylvania-American Water Company (PAWC) operations.

A. Background & Perspective

Among the 13 Human Resources findings Schumaker & Company presented in *Chapter II – Executive Management, External Relations, & Human Resources* are three key findings that supported our need to conduct the *Phase III – Human Resources* project:

- *Finding II-10* Human Resources does not have standard metrics and does not make regular reports of its contribution.
- *Finding II-13* Pennsylvania (PA) training and development is focused on technical training and has not aligned to the broader strategic HR needs of PAWC.
- *Finding II-14* PAWC's Human Resources and executive management have recognized the loss of human capital and the potential for a large number of retirements in coming years but have not developed a plan to respond to these needs.

Consistent with our recommendations to take action in these areas, with the Pennsylvania Public Utility Commission's concurrence, Schumaker & Company presented a proposal to the President of Pennsylvania-American Water Company that offered our support in these areas. Following an intial meeting with the PAWC President, Schumaker & Company consultants met again with the President and her direct reports to review PAWC's strategic direction and to examine how Human Resources can best support the business strategy. During this session, two key strategic priorities emerged:

1. *External focus*: This priority seeks to reconnect PAWC and its employees with external stakeholders, including municipal officers, community representatives, customers, fire departments, regulators, and legislators.
2. *Growth of company*: This priority reaffirms PAWC's intention to expand its operations in Pennsylvania. It was emphasized during the meeting that it is every employee's job to grow the company and that all should have a growth-related objective.

With these priorities clarified, a project team was formed consisting of the Regional HR Director, the HR Manager for Pennsylvania, the Regional Training and Development Manager, and the Vice President of Operations for PAWC. A staff auditor from the Pennsylvania Public Utility Commission (PaPUC) and two Schumaker & Company consultants also participated in the effort. The team met 12 times with each meeting lasting four or more hours.

B. Project Team Deliverables

The team first addressed the Human Resources scorecard and those results are presented in the following section of this chapter. The majority of the team's time was spent developing an approach to workforce planning. Implementation of this project by PAWC will continue through 2009. The results of the team's effort in this area are also discussed in a later section of this chapter. Finally, the team gave consideration to the need to more fully align Human Resources to the strategic priorities of PAWC. Brief discussion of this effort is provided as well in this chapter.

The project team produced the following six tangible deliverables that PAWC will use going forward:

1. Business Strategy Summary
2. Human Capital Scorecard
3. Workforce Planning and Replenishment Project Model
4. Workforce Planning and Replenishment Phase I Project Plan (Microsoft Project®)
5. Retirement data pivot table (for analysis of retirement eligibility by person, location, and job classification) (Microsoft Excel®)
6. HR/Organization Development (OD) Strategy Matrix

Items 1, 3, 4, and 5 are considered competitively sensitive, company-confidential documents and are not included in this report. However, the major elements of the *Phase III* HR project are discussed in this chapter.

Human Capital Scorecard

Schumaker & Company has strongly made the point that the HR function must be accountable to the business and be able to quantify its contribution. This recommendation reflects a broader trend in Human Resources to be a "business partner" and to play a greater role in achieving organizational success. The Human Capital scorecard, based on the format of the balanced scorecard, is a key management tool to strengthen HR's strategic influence within the organization. Through considerable deliberation, the project team set four objectives that would ultimately shape the scorecard.

1. The new scorecard should be constructed within the framework of the four balanced scorecard quadrants (finance, customer, process, and employee) used throughout American Water.
2. The scorecard should emphasize human capital measures over HR efficiency measures (time and cost). Human capital measures reflect the collective knowledge, skills, and abilities of people to contribute to organizational success. This assessment, like any other, is to be developed and utilized to PAWC's advantage.

3. Consistent with the human capital perspective, the scorecard should emphasize leading rather than lagging indicators. Leading indicators describe outcomes that are considered key to future success. Lagging indicators report on events that have already occurred; that is, they reflect past performance.
4. Finally, the scorecard should reflect shared accountabilities between Human Resources and business leaders. Measures that reflect Human Resources' activity alone are most likely to be lagging indicators. If Human Resources is a strategic partner, then the success of managing human capital is the result of the partnership between HR and business leaders who deploy and manage these assets (employees).

Exhibit XIII-1 (on the following page) lists the 14 measures in the PAWC Human Capital scorecard and provides a brief explanation of what is being measured by each.

Financial Measures

The financial measures contain only one traditional HR financial measure: "budget to actual." The project team chose instead to focus on how HR can affect the financial performance of PAWC by assuring that the company is hiring and retaining top talent. These measures look at the number of new hires who remain with PAWC past the first year and the retention of top performers (as measured in the performance evaluation process).

A related measure, "human capital loss risk," looks at the number of job classifications that have current assessments of retirement loss risk and the associated loss of institutional knowledge. This measure directly relates to the workforce planning and replenishment discussed later.

Finally, the scorecard also measures unscheduled absence rate. Unscheduled absences are defined as any absence from work other than vacation and holidays. Such absences include sick, personal, injury, Family Medical Leave Act (FMLA), and short-time disability (STD)/long-term disability (LTD) time. Although there is no indication that unscheduled absence rates are high at PAWC, they are a potentially enormous cost driver and one that every company should be measuring and managing.

Customer Measures

The scorecard measures employee and manager satisfaction with HR. This measurement will be accomplished through periodic surveys that allow internal customers to provide general feedback on HR and specific feedback on services that were used. For example, hiring managers will be able to comment on their satisfaction with HR's management of the hiring process.

Exhibit XIII-1
PAWC Human Capital Scorecard
as of March 31, 2008

Perspective	Measure	What This Measures
Finance	HR budget/actual	Basic measure of financial performance.
	First 12 months' turnover rate	Measures staffing function performance. Reflects the quality of hires.
	Top performer retention rate	Reflects many aspects of HR performance and corporate culture. Top talent retention is a critical strategic objective. Reflects cost avoidance of turnover costs and organizational performance.
	Unscheduled absence rate	Measures a critical aspect of workforce availability. Reflects reduced absenteeism costs and OT avoidance. Also reflects organization culture (Do employees want to come to work?).
	Human capital loss risk	Measures the degree to which HR is managing workforce retention and replenishment. Reflects the degree to which PAWC is safeguarding the loss of institutional knowledge.
Customer	Satisfaction	Measures individual employee satisfaction with HR services (meeting personal needs not organizational needs).
		Measures manager's satisfaction with HR services (support of organizational needs).
		Measures supervisor's satisfaction with training.
		Measures hiring manager's satisfaction with hiring process (includes timeliness, communication, quality of advice, quality of job definition, quality of results, etc.).
		Measures new employee satisfaction with hiring process (includes timeliness, communication, realistic job preview, on boarding, etc.).
Process	Time to fill vacancies	Cycle time measure of staffing process. (The average length of time it takes to fill an open requisition.)
	Candidate quality	Measures the degree to which HR is successful in attracting a highly qualified candidate pool.
	Percentage of exempt and nonexempt positions filled by diverse (women & minorities) display as two measures	Measures the degree to which PAWC is successful in hiring diverse managers and professionals.
Employee (Learning & Growth)	Leadership competency score	Reflects HR's success in developing core competencies of PAWC managers. A key measure of leadership talent.
	Employee engagement	Measures employee attitudes related to many aspects of HR and PAWC as a whole. A key performance indicator (KPI) of organizational culture.
	Internal promotion rate	Reflects HR's success at developing talent. A KPI of bench strength.
	Discrimination charges (agency) filed per hundred employees	Measures organization culture.
	Grievances filed per hundred employees	Measures labor relations climate.

Process Measures

There are literally hundreds of measures of HR's process efficiency and effectiveness. Unfortunately, most are not particularly good measures of HR's contribution to organizational effectiveness. The challenge presented to the project team was to identify the critical few that are most relevant to the HR group in Pennsylvania. Diversity hiring is included here as an indicator of PAWC's success in executing its affirmative action plan and hiring goals.

Employee (Learning and Growth)

The employee measures selected for the scorecard reflect a range of factors. The "leadership competency" scores reflect the quality of leadership in PAWC and the success in developing leaders. The "employee engagement" measure is determined through multiple items on the employee survey. This measure reflects a commitment to undertaking the employee survey as recommended in *Chapter VII – Culture, Management Structure, and Staffing Levels.* The "internal promotion rate" measure is a further indication of the quality of people hired, the success of employee development efforts, and PAWC's commitment to creating career opportunities for its employees. The "grievance rate" and "discrimination charges" measures are key indicators of the climate of the organization.

A number of concerns remain regarding this scorecard. It contains a relatively large number of measures, and there are some challenges to collecting the data that have not been fully resolved. In addition to the scorecard, the project team worked on developing an implementation schedule and on identifying data collection methods. The scorecard itself may be modified based on actual experience.

Workforce Planning and Replenishment

Aging Workforce

Perhaps the most pressing issue facing nearly all utilities is the aging of its workforce. Today, the average American worker is over 40 years old. In the water and wastewater utility industry, the average worker's age is more than 44 years. The American Water Works Association Research Foundation (AWWARF) concluded in a 2005 study that more than 50% of the current workers will no longer be at their utility in 10 years.

One key factor may moderate the effect of these trends. Older worker participation in the labor force is increasing. In the 1970s and 1980s, fewer than 30% of workers 55 and older were active in the labor force. By 2006, participation had grown to 38%. Older workers are more educated, are leading healthier lives, and are living longer. All of these factors increase the likelihood of remaining in the workforce in some capacity.

Changing Demographics

At the same time that an unprecedented number of workers are exiting the workforce, the pool of technically skilled workers is shrinking. In addition, younger workers have different expectations about work, and increasingly, the employer/employee relationship is shorter and less stable. Women and minority participation in the workplace is likely to increase.

Growing Demand for Operators

Employment of water and wastewater treatment plant and system operators is expected to grow by 14% between 2006 and 2016, which is faster than the average for all occupations. An increasing population and the growth of the economy are expected to boost demand for water and wastewater treatment services. As new plants are constructed to meet this demand, new water and wastewater treatment plant and system operator jobs will arise.

Implications

Given these employment and workforce challenges, the AWWRD identified the following implications for water utilities:

- Workforce expectations regarding work/life balance may change.
- Filling technical positions in engineering and treatment operations may become difficult and expensive. Wages for operators and engineers will likely rise.
- The workplace will need to be sensitive to the needs of working parents and older workers.
- Good communicators will be especially valued in utility organizations.
- Large numbers of technically skilled "baby boomer" staff will soon be retiring; drinking water utilities will have to manage the personnel "crunch."
- The challenge of managing a multi-generational, multi-ethnic workforce will continue for water utilities across the nation.
- Drinking water treatment and ancillary (communications, database, etc.) technologies are becoming increasingly complex. Utility mangers will have to exploit these new technologies.
- Water utility mangers will need new tools to acquire and retain good employees who will be dedicated to protecting public health and the environment.
- Labor union issues may grow in importance as cost-cutting and automation reduce job opportunities (in existing classifications). Contract negotiations could become increasingly difficult.

The Harvard Business Review suggests that an aging workforce will compel businesses to change how they operate and could even threaten companies' viability. Construction and utilities will be particularly hard hit.

PAWC's Aging Workforce

These demographic and industry trends are evident at PAWC. At first glance, the level of employees who are eligible to retire seems relatively low. Over the next five years, about 7% of PAWC's workforce will reach age 65, the normal retirement age. Unfortunately, it is likely that many more will retire prior to their 65th birthday. Most PAWC employees are eligible for early retirement when their age added to years of service equals 70. In fact, using the "rule of 70," nearly one-third of PAWC employees will be eligible for retirement over the next five years.

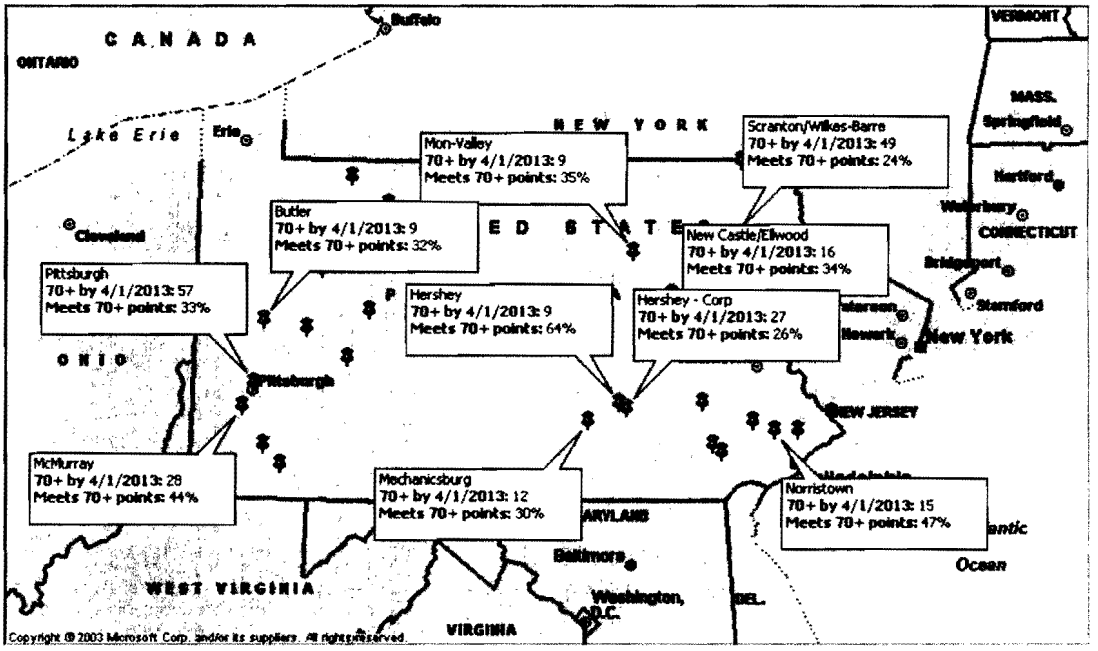
Different employee groups have slightly different pension-payout and benefit-eligibility rules. These differences may affect early retirement decisions, but in general, those employees who have been with PAWC the longest have the most generous pension and benefit plans. As such, the effect of differences is likely to be slight.

In certain job categories, the size of the retirement-eligible group is even greater than the overall average. For example, 46% of the field services utility persons will be eligible for retirement in the next five years. Given the physical nature of the work, it is reasonable to assume that many will exercise their retirement options. Almost 51% of the supervisors and superintendents in field services are eligible for early retirement in the next five years. These positions are particularly difficult to fill.

Our analysis of person-specific detail identified significant risk areas. For example, five of the 16 meter servicemen in Bethel are 55+ with an average "rule of 70" score of 77. Eight network supervisors in western Pennsylvania are 55+ with an average "rule of 70" score of 88. These individuals possess unique critical knowledge of both the system and the industry as a whole.

Some locations have an older workforce than others. *Exhibit XIII-2* shows the percentage of employees who are eligible to retire over the next five years by locations where PAWC has operations. For example, the workforce at Coatesville is relatively young, with only five of 27 employees eligible for early retirement in the next five years. Hershey (not including PAWC corporate staff), on the other hand, has nine of 14 eligible for early retirement in the next five years. In fact, seven of those nine are eligible this year. A further breakdown of the data beyond what we can display in the map shows the more critical situations. For example, 45% of all staff at the Pittsburgh – Hayes plant and 56% of all staff at the Pittsburgh – Aldrich plant will be eligible for retirement in the next five years. Fully 100% of the seven staff members in the administrative group at McMurray are eligible for retirement this year.

Exhibit XIII-2
Percentage of Employees Eligible for Early Retirement in the Next Five Years by Selected Locations as of April 1, 2008



Source: Information Response 850

It is not the point of this report to do an exhaustive analysis of the retirement data. We have chosen to highlight certain points to demonstrate the criticality of the situation. Further analysis will, of course, be required.

Of course, the number of employees who are eligible to retire does not tell us how many will actually retire. What is known is that defined benefit pension plans with generous health benefits, such as that offered by PAWC, encourage early retirement.

Workforce Planning and Replenishment

Given the potentially serious consequences of a large number of employees retiring in the foreseeable future, the project team spent the majority of its time on clarifying PAWC's approach to workforce planning and replenishment and on developing a project plan for implementation.

The project team's effort expands on a workforce replenishment whitepaper prepared by the Regional Human Resources Director that lays out potential strategies. The team also expanded on existing plans for a pilot knowledge-loss risk assessment that was planned for western PA locations. After considerable discussion regarding the definition of this project, the project team identified three key objectives that would guide workforce planning and replenishment:

1. Ensure continuity in critical institutional knowledge
2. Ensure next-generation employees meet the future requirements of PAWC
3. Moderate the impact of high levels of attrition

Based on this clarification, the project team developed a model of the effort. This project model is considered competitively sensitive and, therefore, is not included in this report. However, generally the model identifies the significant objectives and desired outcomes, and lays out various steps necessary to achieve these outcomes in two phases. *Phase I* is primarily focused on the assessment elements of the project. *Phase II* focuses on identifying and implementing strategies that meet the needs identified in the assessment phase. As such, the specifics of *Phase II* are not yet defined. The *Phase I* elements of the project are discussed below.

Critical Knowledge Risk Management

This component of the project is a recommitment of PAWC HR to complete a previously planned pilot of a knowledge-loss risk assessment and retention process developed by Tennessee Valley Authority (TVA). This approach differs from most workforce planning in that it does not focus on general replacement of retiring workers or filling of labor gaps. The TVA approach allows a company to identify critical positions where knowledge loss is the greatest threat. It also helps prioritize the specific knowledge and skills risk through the calculation of a position risk factor. Finally, the process helps a company develop actionable response to mitigate this loss.

Risk mitigation strategies include codification, education training, process reengineering (primarily technology implementation), and the use of alternative resources, including contractors, part-time employment, and retiree programs.

Phase I of this effort is aimed at completing the pilot risk assessment and at identifying the appropriate response. Implementation of these responses and expansion of the process to other PAWC locations are to be included in *Phase II* of this effort. The work plan developed by the project team lays out the specific steps and timetable for implementation.

Workforce of the Future

This component of the project is aimed at assuring that newly-hired workers meet the future requirements of PAWC. The *Phase I* deliverable is a competency model that defines the knowledge, skills, abilities, and attributes of the future workforce. This competency model will likely drive changes in job descriptions and potentially the redesign to entire classifications. It will certainly drive the recruitment plans of PAWC.

Job changes and recruitment plans will be defined and implemented in *Phase II* of the workforce planning and replenishment project. Critical to any recruitment plan will be a strong relationship to PAWC's diversity initiative.

Retiree Retention

Another component of the workforce planning and replenishment project aims to create opportunities to retain retirees in some form of alternative employment with PAWC. Employees who take early retirement often do not wish to fully exit the workforce, but pension plan restrictions limit their opportunities to remain involved. Although legal and policy barriers exist to returning retirees to the PAWC workforce, PAWC HR has already begun to identify and address these issues. This work will continue in *Phase I* of the workforce planning and replenishment project.

Recognizing the value of the human capital that is walking out the door will certainly lead to alternative work arrangements for retirees. Such alternatives will allow retirees to continue some level of involvement with PAWC without jeopardizing their retirement benefits. These individuals are especially valuable as mentors to new and existing employees, and they can make a substantial contribution to reducing the risk associated with the loss of institutional knowledge. The specifics of these alternative work arrangements are to be defined in *Phase II* of the project.

Project Plan

A highly-detailed project plan was developed by the project team and is considered competitively sensitive and is not included in this report. The project plan details *Phase I* aspects of the workforce planning and replenishment project and goes through 2009. The work plan also specifies the steps to define key elements of *Phase II* of the project.

Strategic Alignment

A concern raised in *Chapter II – Executive Management, External Relations, & Human Resources* is that PAWC Human Resources in general and the Organization Development function in particular were not sufficiently aligned to PAWC's strategic directions. This report comes at a time of transition for PAWC with the appointment of a new President and the divestiture of PAWC from its European parent.

This element of the *Phase III* project was aimed at clarifying PAWC's strategic direction, strengthening the dialogue between HR and the business leaders of PAWC, fine-tuning existing HR/OD efforts, and looking at additional ways that HR/OD can support PAWC on a strategic level. This is a complex effort that cannot be fully accomplished within the brief time span of this *Phase III* project."

As a result of the work performed so far, we have achieved greater clarity regarding PAWC's strategic priorities: *external focus* and *growth*. Considerable work remains on bringing further definition to these priorities and on translating strategy into action. After a somewhat difficult start, substantial progress has been made on improving the strategic partnership between HR and business leadership. The participation of the Vice President of Operations for PAWC on this project team was certainly a contributing factor.

The HR leaders continue to develop a detailed strategy matrix that aligns HR activities to the strategic priorities of PAWC. *Exhibit XIII-3* presents a high-level overview of how HR will support these priorities. The HR objectives on the top row are drawn from a document developed by the American Water Human Resources organization in March 2008 for use by the entire company. *Managing Our People Together: Shared Accountabilities* lays out HR objectives, a high-level description of HR programs, and the activities and leadership team accountabilities that are necessary to achieve them.

Exhibit XIII-3
Strategy Matrix
April 1, 2008

PAWC Strategic Priorities	PAWC Human Resources Objectives		
	Assure skilled and diverse workforce availability.	**Support a high-performing organizational culture.**	**Support effective leadership and business strategy.**
External Focus	Develop external partnerships that support skilled and diverse employee availability.	Develop external focus competency at all levels of PAWC.	Integrate external focus in performance management and development.
Growth	Implement comprehensive workforce planning and replenishment that assures a skilled and diverse workforce of the future.	Effectively assimilate new, transferred, or newly promoted employees into PAWC.	Partner with PAWC business leaders to support mergers and acquisition.

Source: Project team deliverables

External Focus

PAWC HR/OD is already engaged in several key external partnerships, including the PA Utilities Industry Partnership (facilitated by the Keystone Development Partnership), which are aimed at supporting job training and developing interest in careers in water. In addition, the PAWC OD Director has played a major role in the PAWC Labor-Management Training Committee to address the training needs of the company. HR will continue to look for external partnerships that support PAWC's success.

In our initial discussion with PAWC business leaders, several spoke of how many managers were not sufficiently skilled in identifying and developing key external relationships. As a result of this identified need, HR plans to recommend the addition of an external focus competency for managers into the existing American Water competency dictionary, which determines the competencies that are used for performance evaluation and development. If incorporated, this competency would be integrated into existing and future management development plans and programs.

Growth

Perhaps no other issue affects future growth than the availability of highly-skilled employees. The workforce planning and replenishment effort, as described in this report, is essential to the long-term growth and viability of PAWC.

In addition, HR will continue to assure that new employees (new hires and employees who join PAWC through acquisitions) will be effectively assimilated into the company. Such efforts include existing programs, such as Basic *Water Business*, as well as new initiatives aimed at the specific needs of new employees.

Moreover, HR will continue to support mergers and acquisitions from due diligence through post-merger integration. Existing approaches and protocols will need to be formalized to assure that HR has the necessary resources and is ready to respond as growth opportunities emerge.

C. Findings & Conclusions

Finding XIII-1 **The models and plans developed as part of this Phase III project provide clear direction for HR's efforts to assist PAWC management in meeting its strategic priorities. Substantial work remains to implement these projects.**

The six deliverables developed as part of this *Phase III* project provide a basis for implementation projects. HR must continue its implementation efforts and report regularly on its progress.

Finding XIII-2 **PAWC HR does not have all the resources necessary to implement the projects defined in the Phase III effort**

Considerable discussion with PAWC HR management has occurred regarding the need for additional resources to fully implement these projects (Human Capital scorecard, Phase I and II of workforce planning and replenishment, and yet to be specified projects associated with supporting PAWC's business strategy). HR must complete a more detailed resource request and provide it to PAWC management for funding and hiring approval, as necessary.

D. Recommendations

Recommendation XIII-1 **Provide resources and perform timely implementation of the six deliverables developed as part of this Phase III project. (Refer to Finding XIII-1 and Finding XIII-2)**

During the course of this project, PAWC Human Resources has made substantial progress in addressing the findings discussed by Schumaker & Company earlier in this chapter. Considerable work remains and it is certain that additional resources will be required to implement the models and plans developed as part of this *Phase III* project, specifically those in the following areas:

- Human capital scorecard
- Workforce planning and replenishment
- Strategic alignment

Timely implementation of the tasks identified in these three areas is essential to HR aligning its activities to those of PAWC's strategic priorities.

PAWC leadership must provide resources to assure that this work is completed on schedule. In addition, operational management plays a key role in the implementation. HR cannot implement these initiatives without line management's direct involvement and participation.

American Water has been working to define shared accountabilities within the company and this project reflects the necessity of all parties to deliver on these accountabilities. Continuing to develop the partnership between Human Resources and the PAWC business leadership will contribute substantially to the success of this effort.

XIV. Appendix A: Data and Statistics

Pennsylvania-American Water Company (PAWC) is a public utility under the Pennsylvania Public Utility Code subject to regulation by the Pennsylvania Public Utility Commission (PaPUC). Incorporated in July 1904, it is the largest investor-owned water utility in the state, providing water and/or wastewater services to over 630,144 water customers and over 14,576 wastewater customers in 35 of Pennsylvania's 67 counties. The population in its service territory is more than two million. PAWC has nearly 1,000 employees. PAWC operates under rules and regulations established by the PaPUC, Department of Environmental Protection (DEP), and U.S. Environmental Protection Agency (EPA). It operates some 36 water treatment plants, four wastewater facilities, 100+ well stations, and a distribution system of more than 9,200 miles. Its source of supply is approximately 92% surface, 6% wells, and 2% purchases. (Refer to *Chapter V – Water Operations* for a more detailed discussion of PAWC's operations.)

PAWC is headquartered in Hershey, Pennsylvania and is a wholly owned subsidiary of American Water. Works Company founded in 1886 as the American Water Works & Guarantee Company and reorganized in 1947 as American Water Works Company, Inc. With a history of over 100 years, American Water provides water, wastewater, and other water-related services to approximately 15.6 million people in 32 states and Canada and has partnered with many municipalities within their non-regulated products and services group to maintain and operate municipal systems. American Water has revenues of approximately $2.2 billion and employs approximately 7,000 professionals. In addition to its regulated operations in Pennsylvania, American Water manages the Meadville Area Water Authority, serving an additional 16,000 people. American Water is an integrated part of RWE AG (Essen, Germany), a leading Germany utility company. In fiscal 2005, RWE reported 41.8 billion Euros in revenue and employees of approximately 86,000.

This appendix details PAWC's operations and financial performance. It is divided into two sections:

- *Section I:* PAWC's annual data and compound growth percentage by category over a ten-year period (1997 to 2006)
- *Section II:* Comparative analysis of PAWC to a select group of water utilities over a five-year period (2002 to 2006), including:
  - Non-American Water companies (individually and subtotaled)
    - Aqua Pennsylvania (Aqua PA)
    - Aquarian Connecticut (Aquarian CT)
    - San Jose Water Corporation
  - American Water companies (individually and subtotaled)
    - Elizabethtown Water
    - Missouri-American Water Company
    - New Jersey-American Company

Schumaker & Company has reviewed the *National Association of Water Companies* (NAWC) *Financial and Operating Data for Investor-owned Water* Utilities covering years 1997 through 2006 and other documents furnished by the PaPUC, regulated water utility companies operating in Pennsylvania, and a few select non-Pennsylvania based companies. NAWC publishes relevant information on financial and physical operations. Collected data include all line items from balance sheet, income statement, cash flows, plant in service, depreciation, depletion and amortization, taxes, salaries, operating revenue, sales, number of customers, operation and maintenance expenses, environmental facilities and expenses, and much more.

For many years, water utilities have been referred to as "silent servants." This was an appropriate descriptor. The operation of water utilities 15 years ago was characterized by consistently low rates, availability of generally inexpensive water supplies, infrequent contact with the public and the regulatory community (at least in comparison with today), relatively unchanging drinking water regulations, only gradual introduction of computerization, and an infrastructure that was for the most part "out of sight, out of mind." There was little innovation because it was not perceived to be needed.

Today, new challenges are making water operations a dynamic and rapidly changing environment, requiring increased interaction between the functional areas, new technologies, expanded capabilities from staff personnel, and for some utilities, re-evaluation of utility philosophies. Utilities have had to increase staff and obtain new technical skills. Many utilities have had to re-assess the extent to which analytical laboratory functions should remain in-house. New regulations, such as those pertaining to the disposal of sludge and the protection of aquatic wildlife, have also had important implications on water utility operations. One effect of these regulations has been to decrease the accessibility of water supplies and/or increase the cost of developing new supplies. In addition, many utilities have had to deal with the possibility that their current raw water sources may be inadequate over the long-term. Because of the combination of these factors, techniques used to determine "least-cost" long-term supply planning alternatives have become more rigorous for many utilities. Demand management, conservation, and other non-conventional solutions have become important elements in long-term planning. The implications on water rates have resulted in greater interaction between the engineering design, finance and rates, and customer relations departments of many utilities throughout the long-term planning process.

Infrastructure rehabilitation, establishment of new rate structures that encourage (as oppose to discourage) water conservation, and computerizing the system wherever possible to achieve greater efficiencies of operation are just some of the pressing needs facing water utilities. The now successful water utility is one that seeks to cope with the demands of the following:

- *Maintaining Compliance with the Safe Drinking Water Act (SDWA) Amendments and Other Regulations* – Much of the initial challenges of SDWA are behind the largest utilities. Nonetheless, cost and compliance issues with regard to the disinfection byproducts rule, the lead and copper rule, radionuclide rule, groundwater contamination, and others are still important concerns. Some regulations impacting (or potentially impacting) water utilities include:

- Interim Enhanced Surface Water Treatment Rule
- Long-term 1 Enhanced Surface Water Treatment Rule
- Long-term 2 Enhanced Surface Water Treatment Rule
- Stage 1 Disinfectants/Disinfection Byproducts Rule
- Stage 2 Disinfectants/Disinfection Byproducts Rule
- Filter Backwash Recycling Rule

- *Convincing the Public That Dramatic Increases in Water Rates are Justified* – Economists speak of the consumer's "ability to pay" and "willingness to pay." Environmental groups and other interest groups can force utilities, through public pressure, to become public relations experts.

- *Addressing Accumulated "Deferred Maintenance" Problems* – Many water utilities have "unaccounted-for-water" percentages ranging from 15% to 40%. This is often tolerated because of the expense and disruption resulting from digging up and replacing old, leaky mains. This is an inefficient practice that must be corrected. If a utility is faced with constructing a filtration plant, the savings that can be realized in reduced design capacity as a result of reducing "unaccounted-for-water" percentages to 10% to 12%, more than justifies costs to replace aging mains.

- *Dealing with Inadequate Quantities of Water* – Water shortages used to be a purely "west of the Mississippi" phenomenon. Water was plentiful in the East where the mean annual rainfall amounts to about 40 inches. This is no longer the case. Many utilities, east and west, face water shortages. Water conservation is a reality. This will manifest itself in a number of forms: peak period pricing, use of demand management techniques, 100% metering, reduction of leakage, adoption of rate structures which penalize excessive use, and public appeals to conserve.

- *Attracting, Training, and Retaining Skilled Human Resources* – Water supply, though not often viewed as an environmental function, is nevertheless forced to compete with environmental firms, other utilities, and other governmental entities for skilled individuals. Implementing the Clean Water Act, the Clean Air Act, a reauthorized Resource Conservation and Recovery Act, Superfund, and other environmental laws requires huge amounts of money and many trained people. The growth of environmental engineering firms is constrained primarily by the lack of skilled people; thus, they look to water utilities, state government, and other related sectors for skilled individuals. Human Resource departments face other pressures, such as demands for higher skills, requirements for higher wages, and the need for detailed training (e.g., in water systems engineering, management, use of computers, etc.).

- *Obtaining Capital* – Financing is always a major challenge for utilities. The limitations on tax-exempt financing posed by the Tax Reform Act of 1986, competition for capital make it difficult for water utilities to obtain the funding needed to make capital improvements, rehabilitate their systems, and obtain new sources of supply.

- *Moving to an Age of Automation* – Computerization is essential to increase productivity, achieve efficiency, and reduce costs. Many water utilities have installed Supervisory Control and Data Acquisition (SCADA) systems, others have computerized their billing systems, while still others have moved toward installation of automatic or central meter reading systems (AMR or CMR). As these technologies are demonstrated effective, more utilities will purchase and use automated systems.

In short, although it has become more difficult to develop solid conclusions from just looking at these numbers, this analysis is useful in providing some insights into the changes taking place at PAWC – recognizing the above issues.

A. Section 1 – PAWC

This section of the report uses NAWC as its major source of data and presents the annual statistics of Pennsylvania-American Water Company for the years 1997 through 2006.

- Total net plant in service
- Water sales by volume (millions of gallons)
- Operating revenue
- Total average number of customers (year-end)
- Total employees (year-end)
- Total operation and maintenance expense
- Miles of main in service
- Performance ratio expense

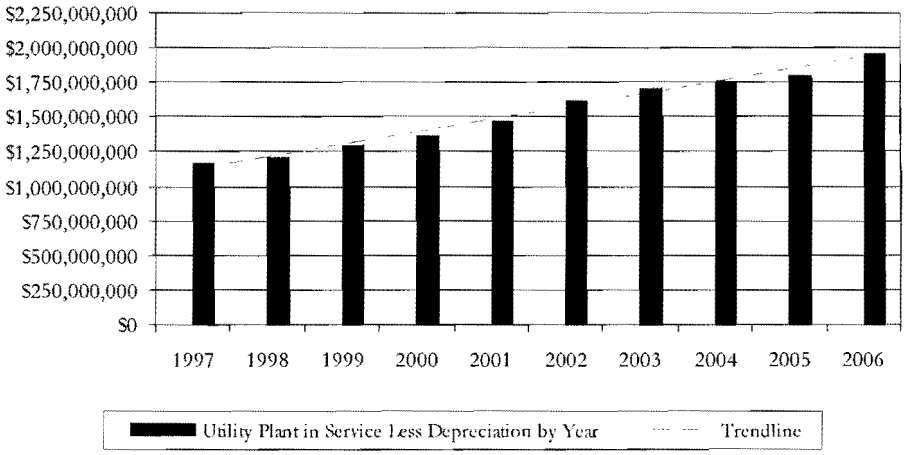
(PAWC 1997-2005 data is based on annual PaPUC reports under NARUC guidelines. The source information is not based on audited financial statements and, therefore, may not reflect audit adjustments (e.g., 2005 and 2006)).

Total Net Plant in Service

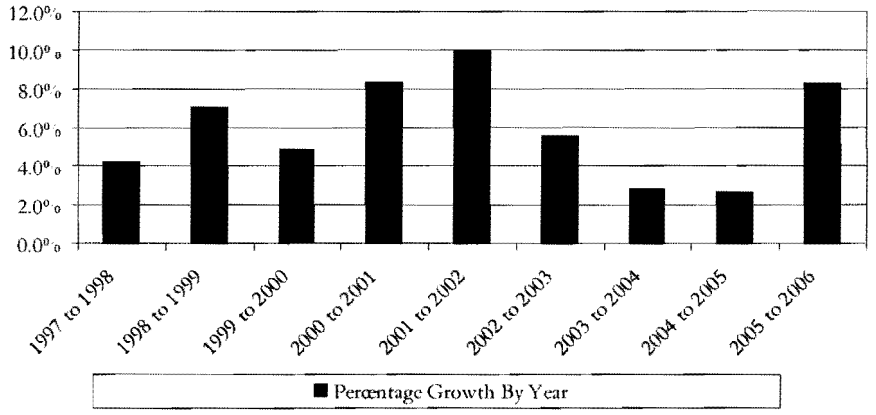
Exhibit XIV-1
Total Net Plant in Service

Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Loss
Utility Plant in Service Less Depreciation	$1,158,650,999	$1,207,026,112	$1,291,675,886	$1,355,047,587	$1,468,116,457	$1,613,648,666	$1,703,422,931	$1,751,300,272	$1,796,735,724	$1,944,628,000	5.86%
Dollar Growth by Year		$48,375,113	$84,649,774	$63,371,701	$113,068,870	$145,532,209	$89,774,265	$47,877,341	$45,435,452	$147,892,276	
		1997 to 1998	1998 to 1999	1999 to 2000	2000 to 2001	2001 to 2002	2002 to 2003	2003 to 2004	2004 to 2005	2005 to 2006	
Percentage Growth by Year		4.2%	7.0%	4.9%	8.3%	9.9%	5.6%	2.8%	2.6%	8.2%	

Net Plant by Year



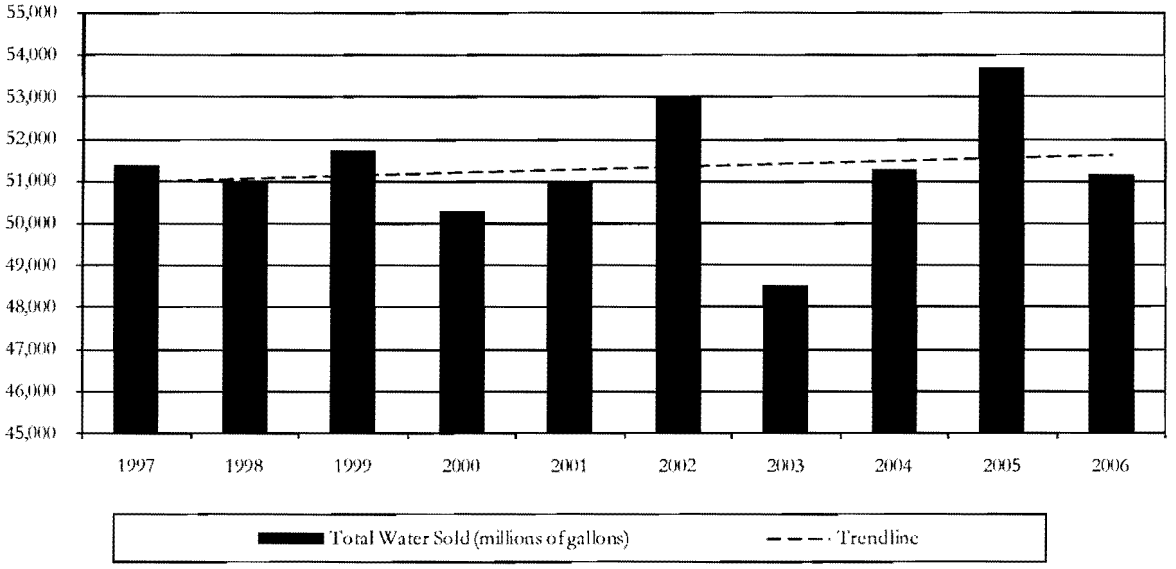
Percentage Growth by Year

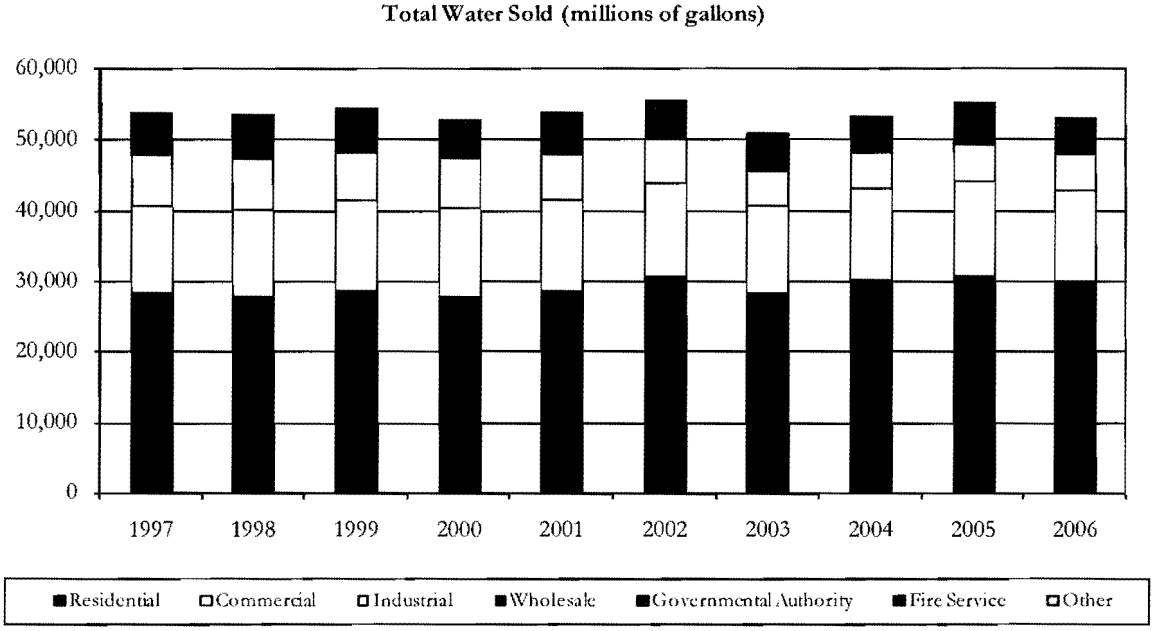


Water Sales by Volume (millions of gallons)

Exhibit XIV-2
Total Water Sold

Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Loss
Water Sold (millions of gallons)											
Residential	28,200	27,769	28,452	27,728	28,595	30,559	28,268	30,137	30,769	29,949	0.66%
Commercial	12,471	12,375	12,889	12,684	12,786	13,351	12,316	12,917	13,236	12,856	0.34%
Industrial	7,012	7,251	6,781	6,788	6,456	6,031	4,890	5,096	5,157	4,966	-3.72%
Wholesale	718	574	586	354	257	308	238	555	783	713	-0.08%
Governmental Authority	2,949	2,982	3,004	2,727	2,874	2,600	2,393	2,552	2,659	2,625	-1.27%
Fire Service	2	0	0	0	0	116	426	0	536	0	-100.00%
Other (Utility & Non-Utility)	0	0	0	0	0	0	0	0	0	0	N/A
Total Water Sold	51,352	50,951	51,712	50,281	50,968	52,965	48,531	51,257	53,716	51,109	-0.05%



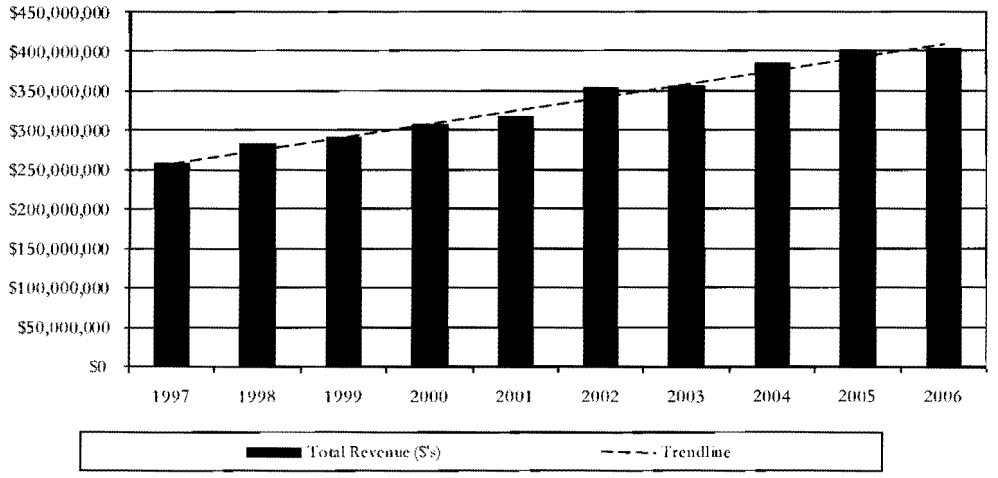


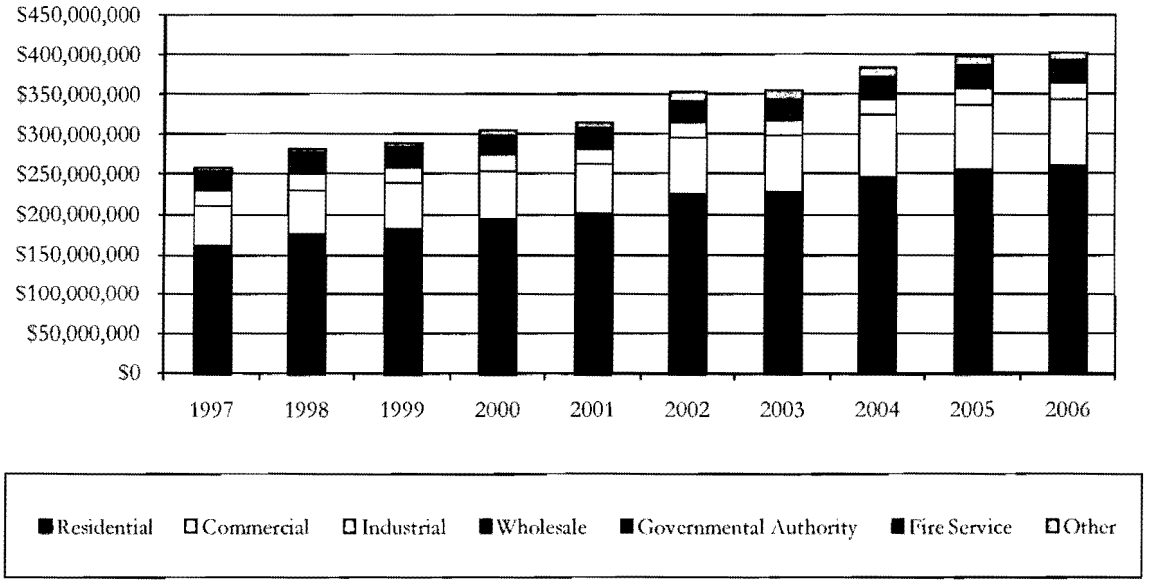
Water sold in 2003 was substantially down, although revenues were not (as shown in next *Operating Revenue* section). According to American Water management, the reclassification of industrial customers into the commercial bill class was partially responsible for the reduction in water sold. Also, for the years 2003 to 2005, under RWE ownership, PAWC was required to close its books for the calendar year in early December. Therefore, PAWC financial data (revenues and expenses) were accrued to December 31 of each year, while statistical data (such as water sold, which is based on billed usage) was not.

Operating Revenue

Exhibit XIV-3
Operating Revenue

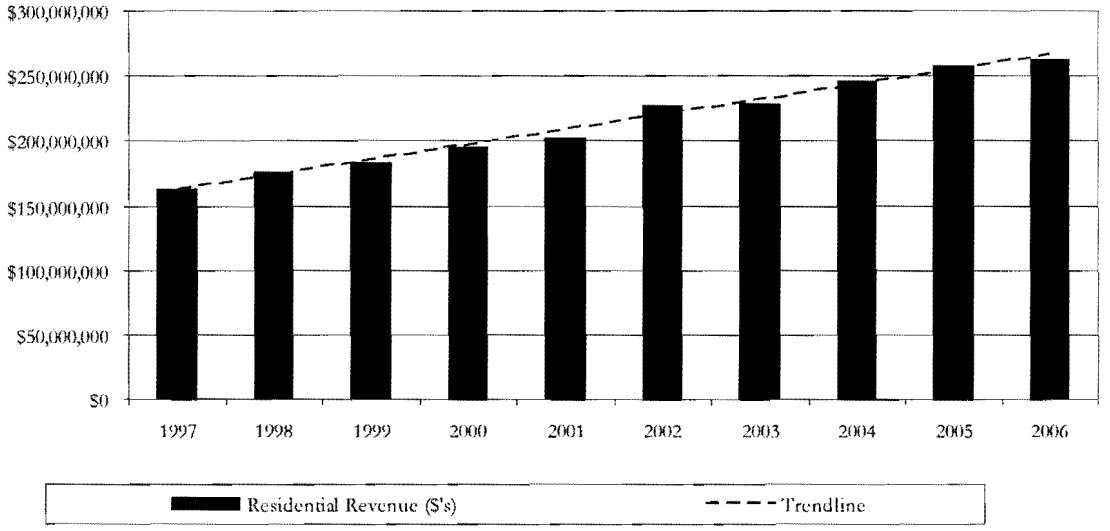
Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Loss
Revenue ($'s)											
Residential	162,974,256	176,155,034	183,482,822	194,398,466	202,446,808	226,575,152	228,809,241	246,333,788	257,225,435	261,751,000	5.35%
Commercial	48,456,873	53,959,875	56,523,268	60,325,569	61,755,608	69,568,695	71,054,559	78,722,592	81,202,972	82,799,000	6.07%
Industrial	19,459,801	21,852,820	20,681,327	21,199,760	21,127,271	21,311,584	19,563,868	20,684,095	21,232,096	21,417,000	1.06%
Wholesale	2,267,765	2,196,295	2,194,829	1,393,405	901,488	1,757,631	1,249,264	1,535,296	2,085,539	1,972,000	-1.53%
Governmental Authority	9,754,747	12,006,358	11,928,989	12,110,987	11,826,235	12,728,972	12,960,136	14,133,775	15,574,261	16,115,000	5.68%
Fire Service	10,997,892	11,088,106	11,349,827	10,824,367	10,877,460	10,910,570	11,294,979	11,160,570	10,274,567	10,803,000	-0.20%
Other (Utility & Non-Utility)	4,602,021	4,800,832	4,867,528	5,558,053	8,406,324	10,669,900	10,574,997	11,831,175	12,200,929	7,893,000	6.11%
Total Revenue	258,512,855	282,059,219	291,028,590	305,810,487	317,341,194	353,522,504	355,507,044	384,402,191	399,795,739	402,750,000	5.00%



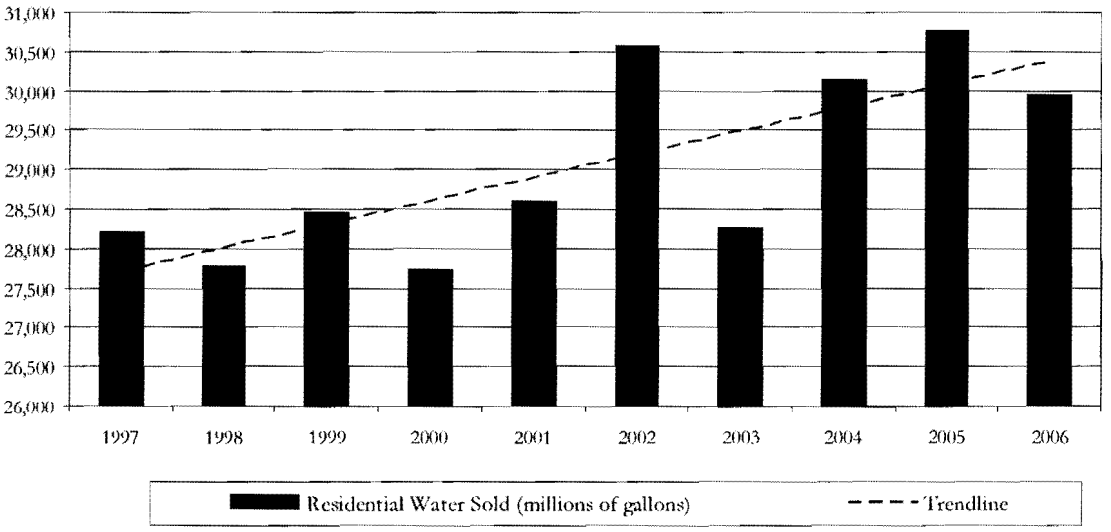


Residential Revenue versus Water Sold

Exhibit XIV-4
Residential Revenue

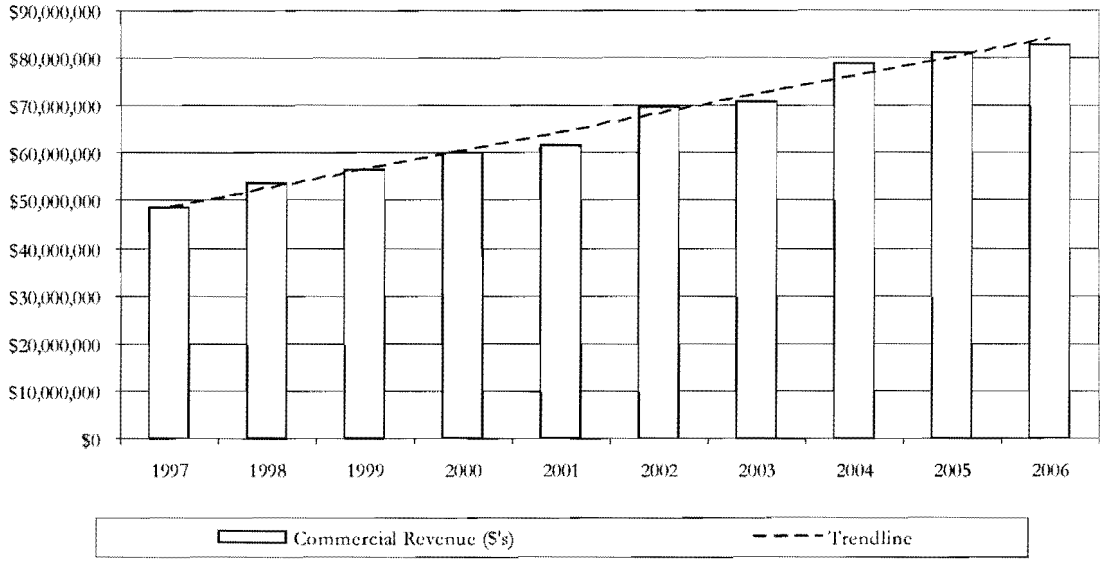


Residential Water Sold

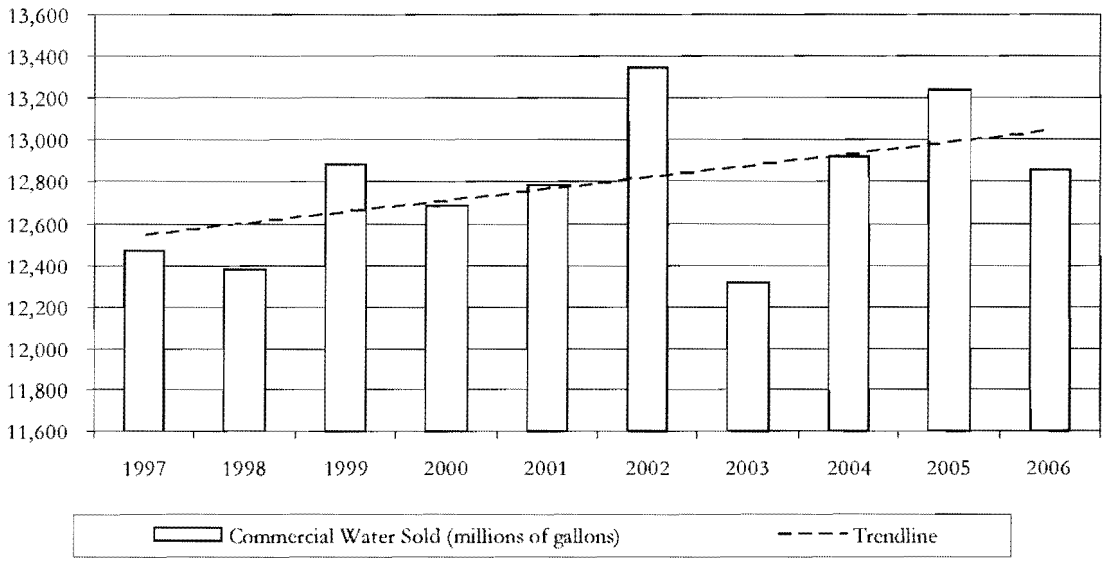


Commercial Revenue versus Water Sold

Exhibit XIV-5
Commercial Revenue

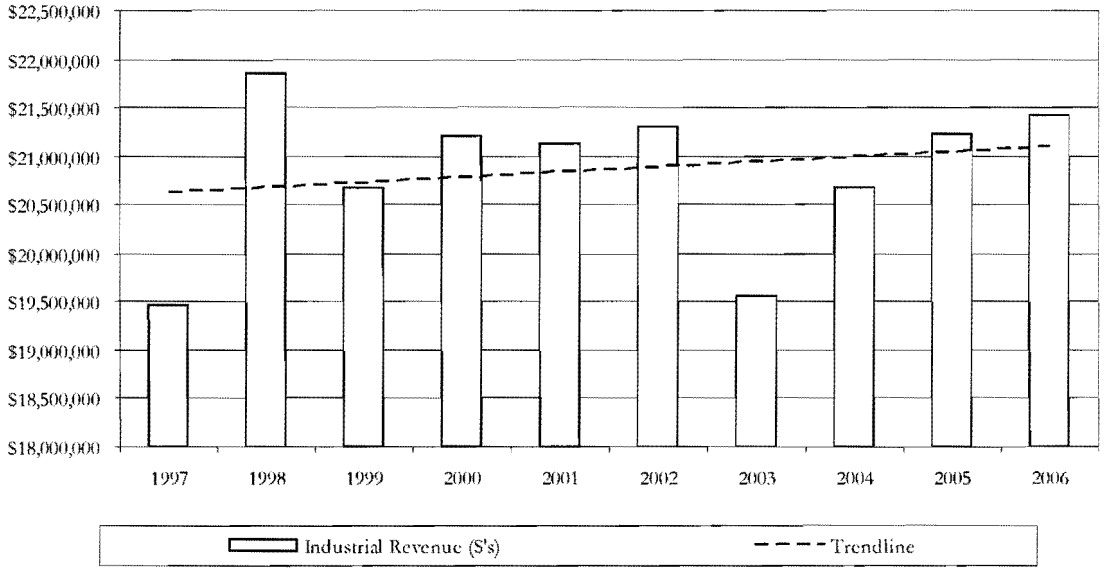


Commercial Water Sold

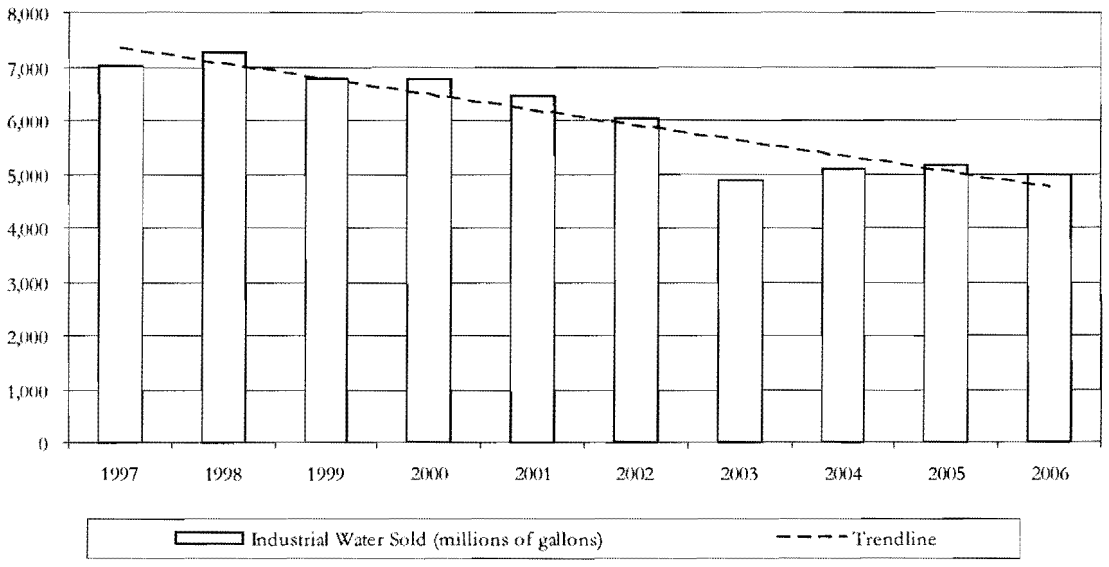


Industrial Revenue versus Water Sold

Exhibit XIV-6
Industrial Revenue



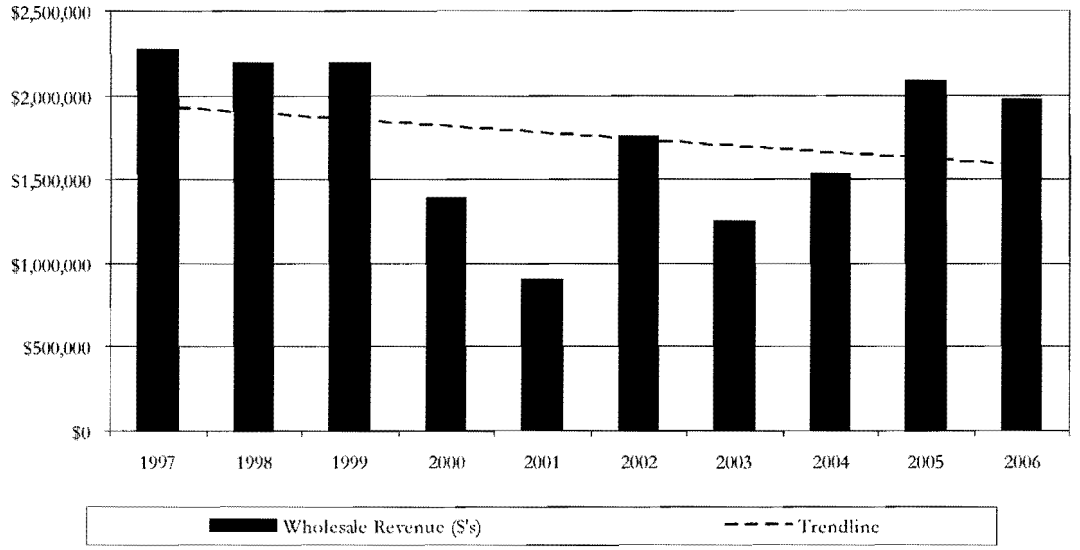
Industrial Water Sold



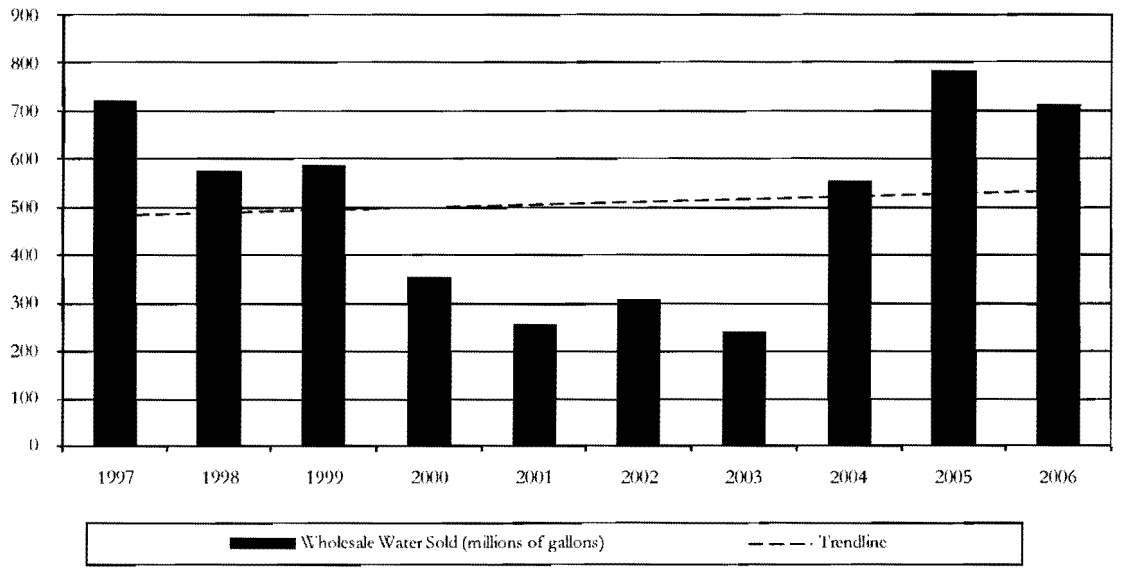
As discussed previously, water sold is based on billed usage and the year-end close in 2003 was December 12, while revenue was based on both billed and unbilled usage.

Wholesale Revenue versus Water Sold

Exhibit XIV-7
Wholesale Revenue

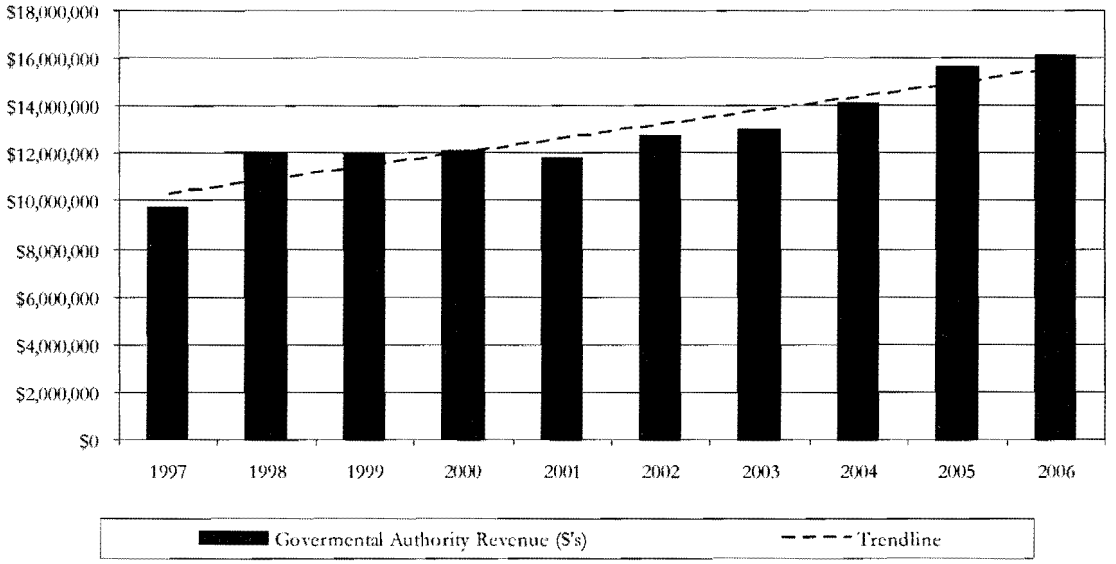


Wholesale Water Sold

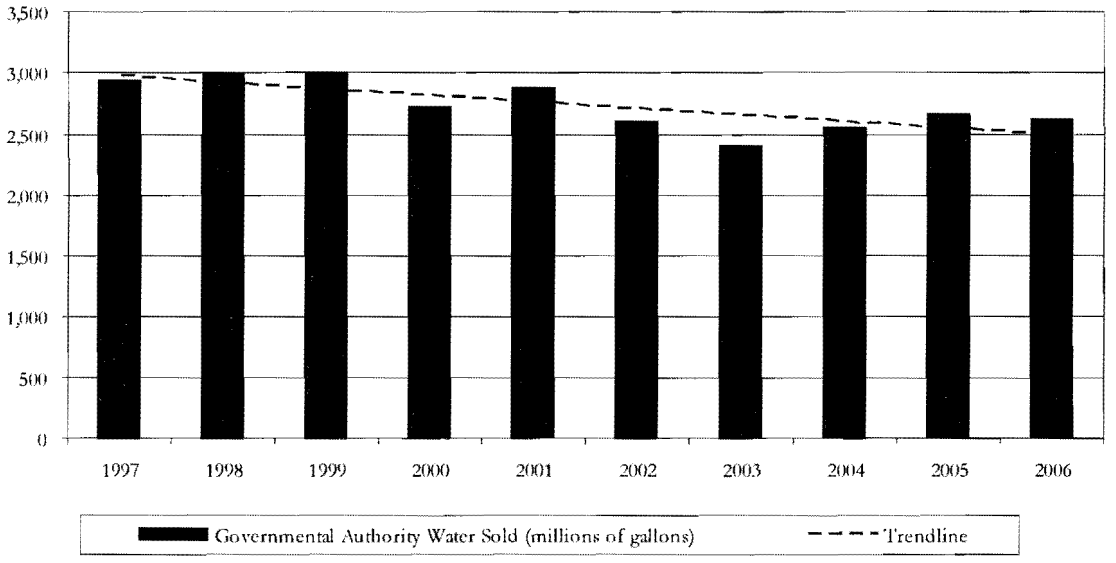


Governmental Authority Revenue versus Water Sold

Exhibit XIV-8
Governmental Authority Revenue

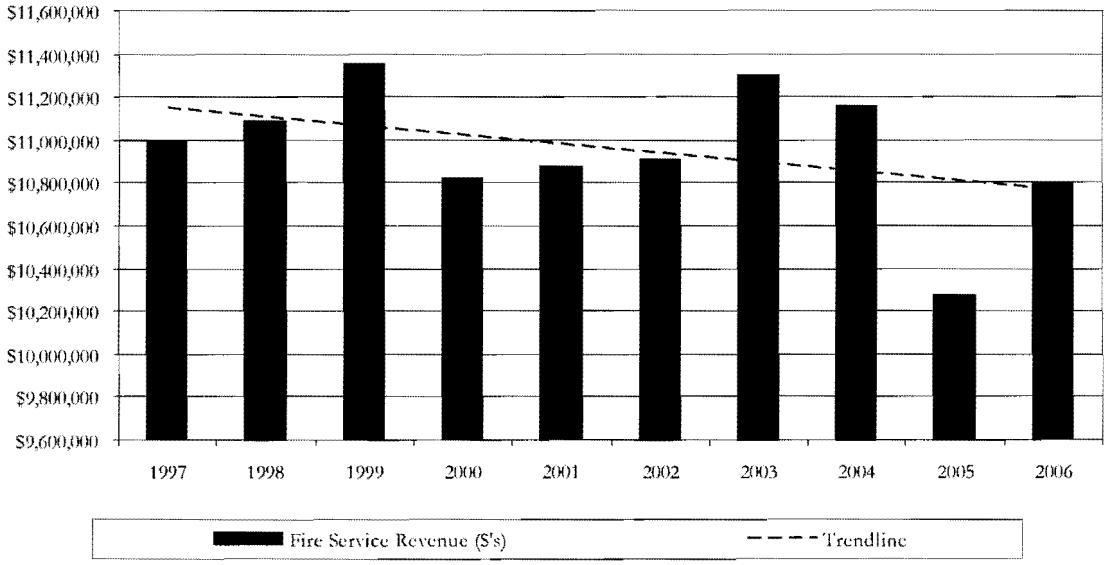


Governmental Authority Water Sold

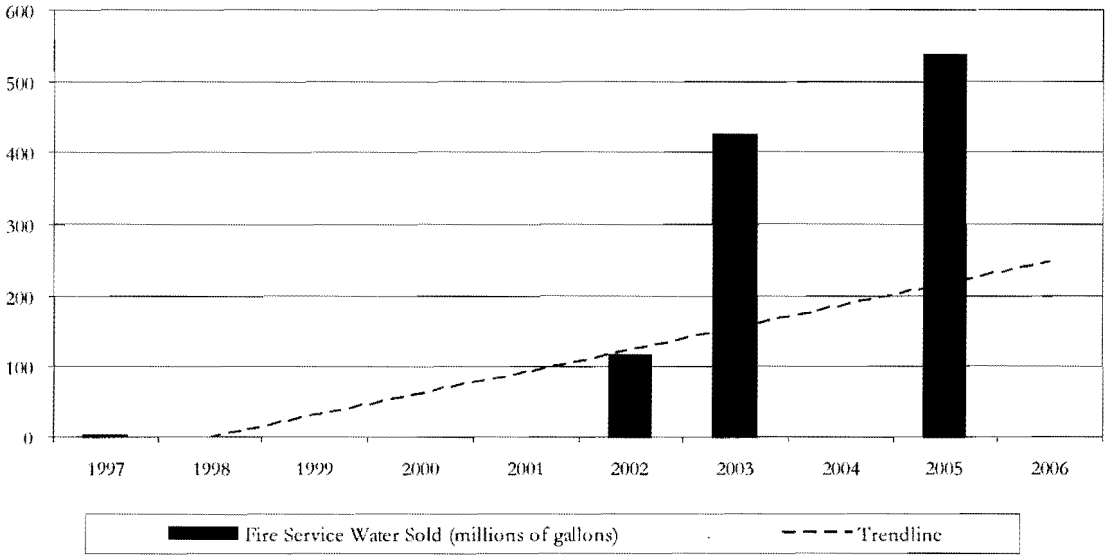


Fire Service Revenue versus Water Sold

Exhibit XIV-9
Fire Service Revenue



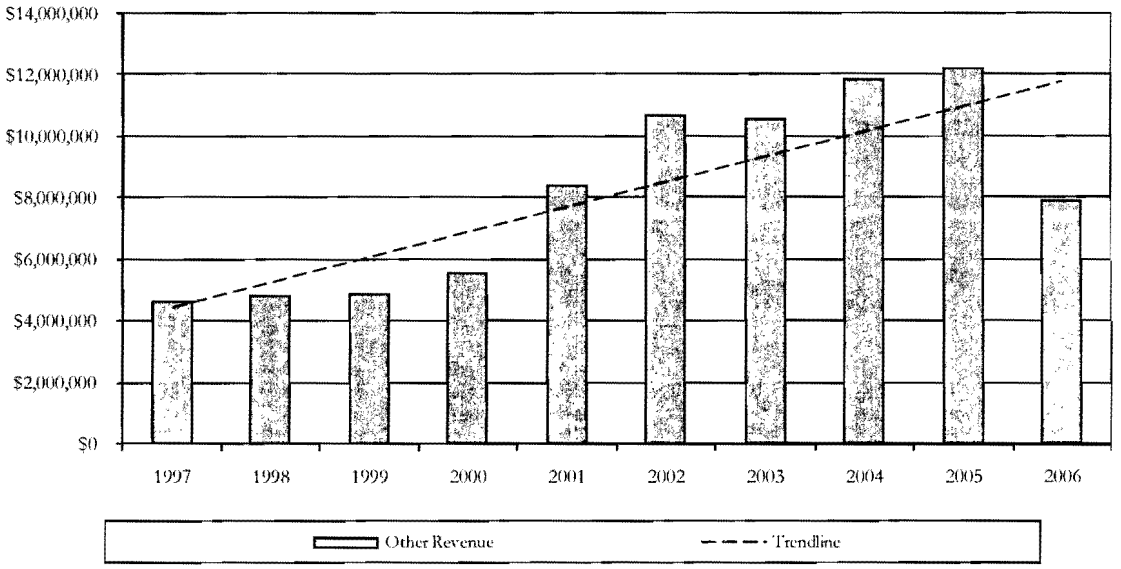
Fire Service Water Sold



As fire service is a flat rate, PAWC does not typically report usage for this bill class, although figures were provided for 2002, 2003, and 2005.

Other (Utility & Non-Utility) Revenue

Exhibit XIV-10
Other (Utility & Non-Utility) Revenue

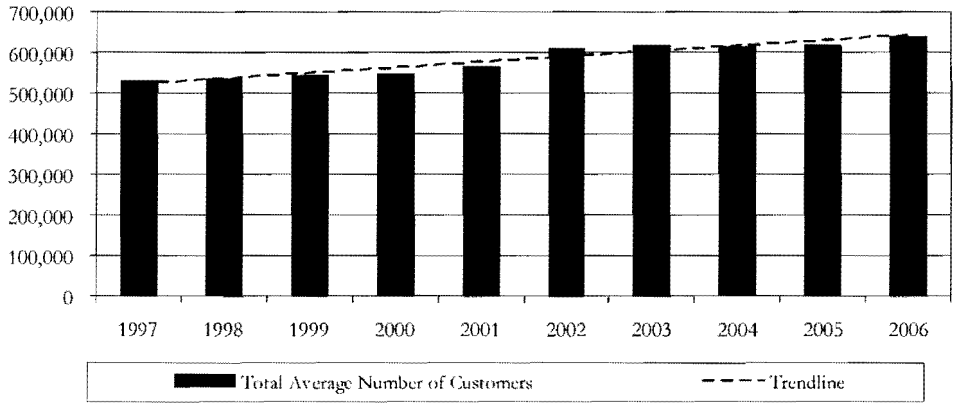


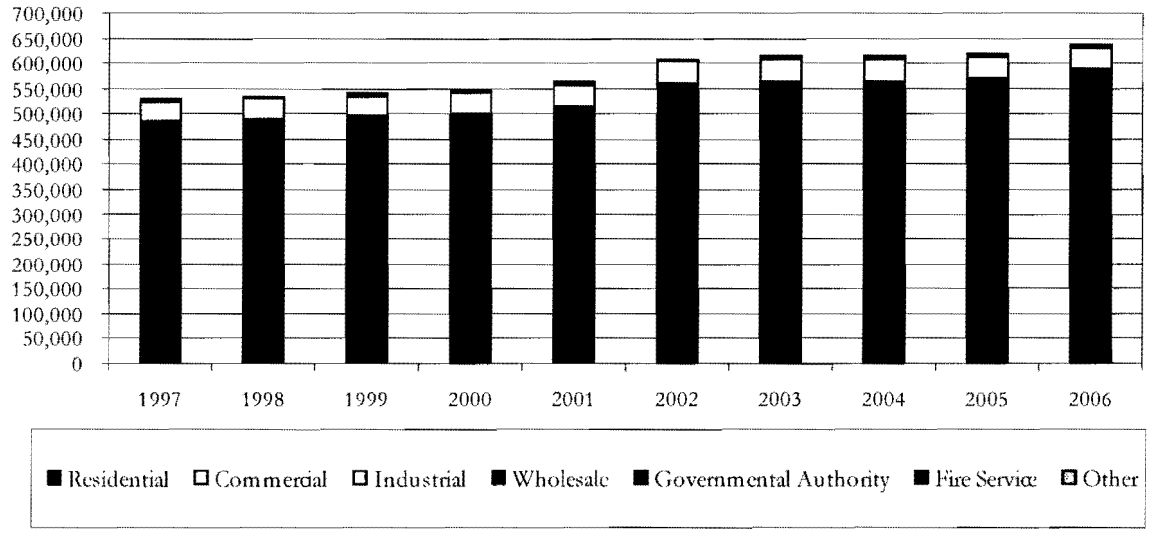
Total Average Number of Customers (year-end)

Exhibit XIV-11
Total Average Number of Customer (year-end)

Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Loss
Average Number of Customers											
Residential	486,299	490,475	495,917	500,922	516,558	559,570	565,301	565,290	569,432	588,133	2.11%
Commercial	38,599	38,587	38,783	39,029	40,590	43,040	43,229	42,560	42,475	42,996	1.19%
Industrial	877	811	811	803	852	976	959	899	883	873	-0.05%
Wholesale	32	30	28	25	29	26	24	23	24	28	-1.46%
Governmental Authority	2,266	2,162	2,153	2,178	2,234	2,258	2,294	2,301	2,298	2,421	0.73%
Fire Service	2,784	2,815	2,833	2,794	2,818	3,240	3,262	3,235	3,223	3,209	1.58%
Other	0	0	0	0	0	0	0	0	5	0	N/A
Total Customers	530,857	534,880	540,525	545,751	563,081	609,110	615,069	614,308	618,340	637,660	2.04%

Total Average Number of Customers





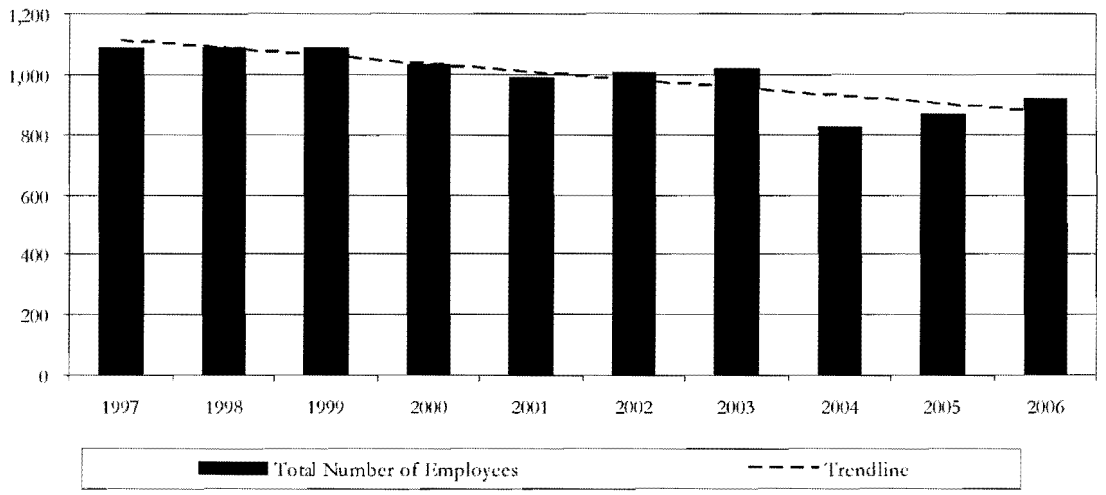
Total Employees (year-end)

The counts in *Exhibit XIV-12* represent end-of-year totals and include active, full-time and part-time employees.

Exhibit XIV-12
Total Employees (year-end)

Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Los
Total Number of Employees	1,089	1,085	1,088	1,032	989	1,004	1,018	824	868	917	-1.87%

Total Employees (year-end)



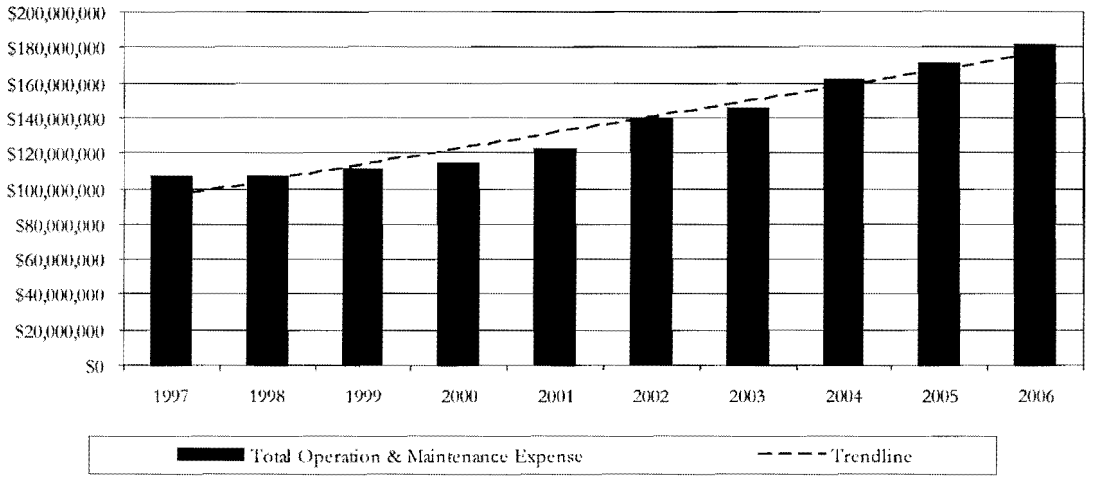
The reorganization that created the regional American Water Works Service Company, Inc. (AWWSC) organization was primarily implemented during 2004 and the transfer of personnel from PAWC to AWWSC is the primary reason for the reduction in PAWC staff.

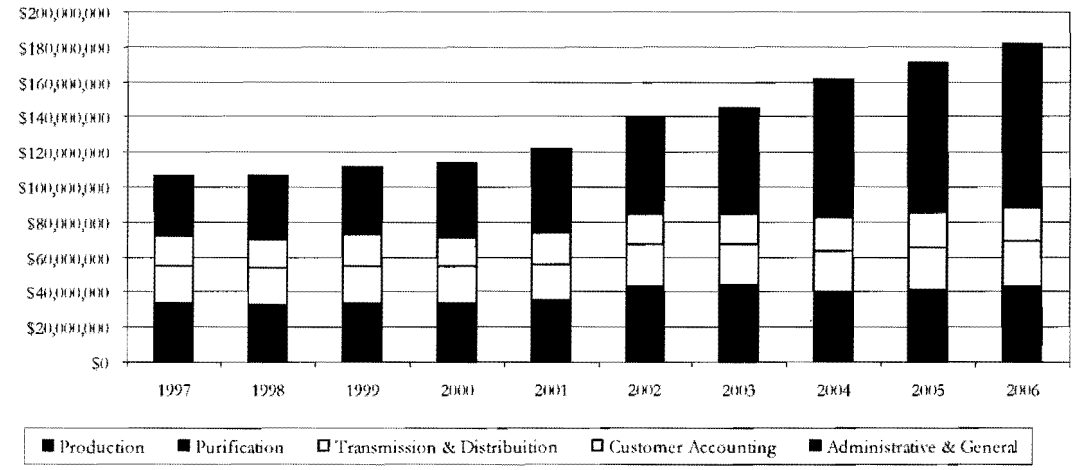
Total Operation and Maintenance Expense

Exhibit XIV-13
Total Operation and Maintenance Expense

Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Loss
Production Expense	14,453,856	4,812,315	4,908,655	4,676,801	4,460,017	7,752,285	7,689,097	6,793,175	7,381,507	5,733,244	-9.67%
Purification Expense	18,788,159	28,099,591	28,784,318	29,040,717	30,811,544	35,073,349	36,209,603	33,221,018	34,241,715	37,841,759	8.01%
Transmission & Distribution Expense	21,211,501	20,956,664	21,582,654	20,765,738	20,289,497	24,055,511	23,267,164	23,573,589	24,014,129	25,866,804	2.21%
Customer Accounting Expense	17,674,295	16,405,695	17,513,011	16,796,376	18,457,471	17,675,097	17,382,430	19,517,836	20,119,161	18,892,361	0.74%
Administrative & General Expense	34,407,817	36,247,597	38,418,676	42,589,031	47,847,408	55,843,120	60,391,914	78,121,997	85,683,241	93,101,420	11.57%
Total Operation & Maintenance Expense	106,535,628	106,521,862	111,207,314	113,868,663	121,865,937	140,399,362	144,940,208	161,227,615	171,439,753	181,475,588	6.03%

Total Operation and Maintenance Expense

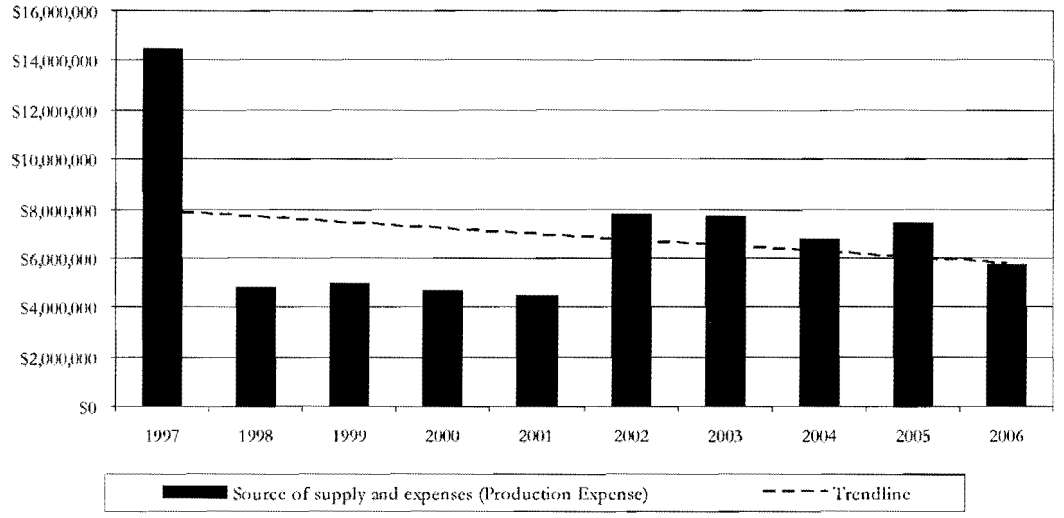




Since 2003 substantial changes in PAWC O&M expense have occurred. According to American Water management, the regional component of American Water Works Service Company (AWWSC) was implemented at the end of 2003. AWWSC management fee increases of approximately $15.4 million have been partially offset by reduced PAWC labor costs of approximately $5 million. Other categories of costs that have caused this increase in O&M expense include: insurance ($1 million), software licenses ($800,000), transportation-related fuel costs ($600,000), and contract services for temporary employees ($600,000). Also, the classification of amortization of net negative salvage as O&M expense beginning in 2005 also unfavorably impacted expenses by $1.3 million. In addition to these increases, security services reflected a $7.3 million increased due to a $5.6 million deferral credit in 2003. General office expenses in 2005 included expenses of $5 million of previously deferred project initiative costs.

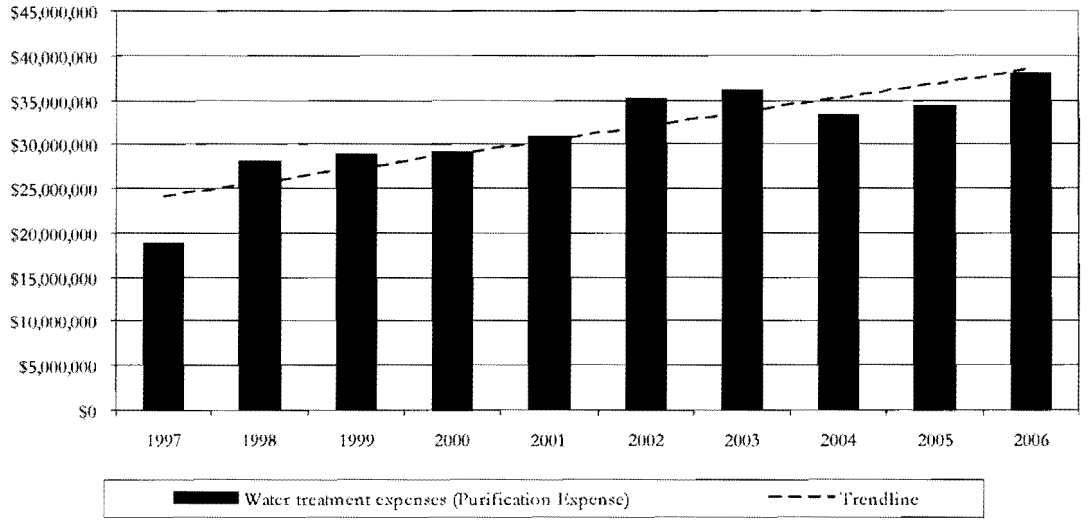
Production Expense

Exhibit XIV-14
Production Expense



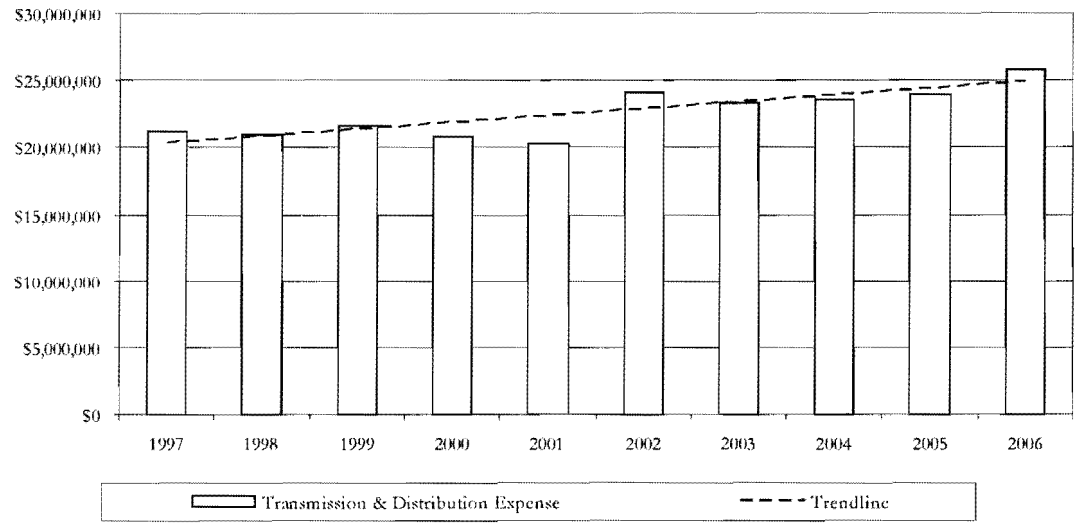
Purification Expense

Exhibit XIV-15
Purification Expense



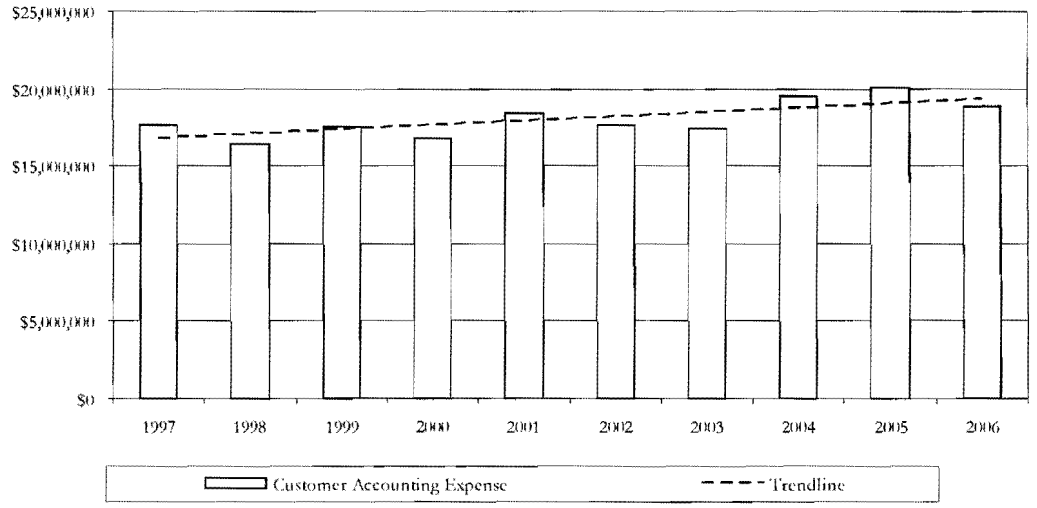
Transmission and Distribution Expense

Exhibit XIV-16
Transmission and Distribution Expense



Customer Accounting Expense

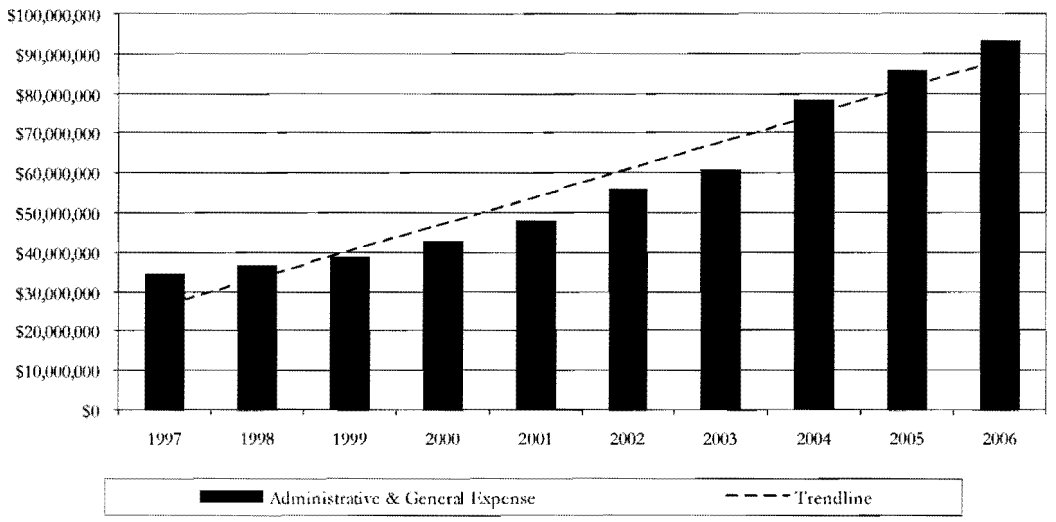
Exhibit XIV-17
Customer Accounting Expense



According to American Water management, increases in uncollectible expenses, associated with increased revenue and slightly higher uncollectible rate, and postage expenses account for most of the increase in PAWC customer accounting expense from 2003 to 2005.

Administrative and General Expense

Exhibit XIV-18
Administrative and General Expense



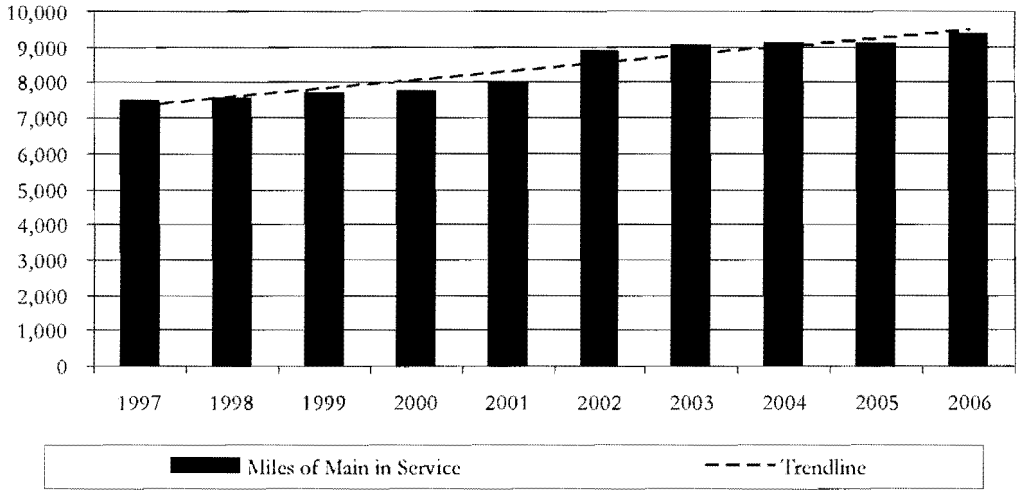
According to American Water management, increases to O&M expenses are also relevant to A&G expenses. The increase in O&M expenses is slightly more than increases to the A&G component of total O&M expenses, as production cost increases are included in O&M expenses, but not A&G expenses.

Miles of Main in Service

Exhibit XIV-19
Miles of Main in Service

Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Los
Miles of Main in service	7,466	7,560	7,714	7,758	8,040	8,891	9,037	9,108	9,108	9,370	2.53%

Miles of Main in Service



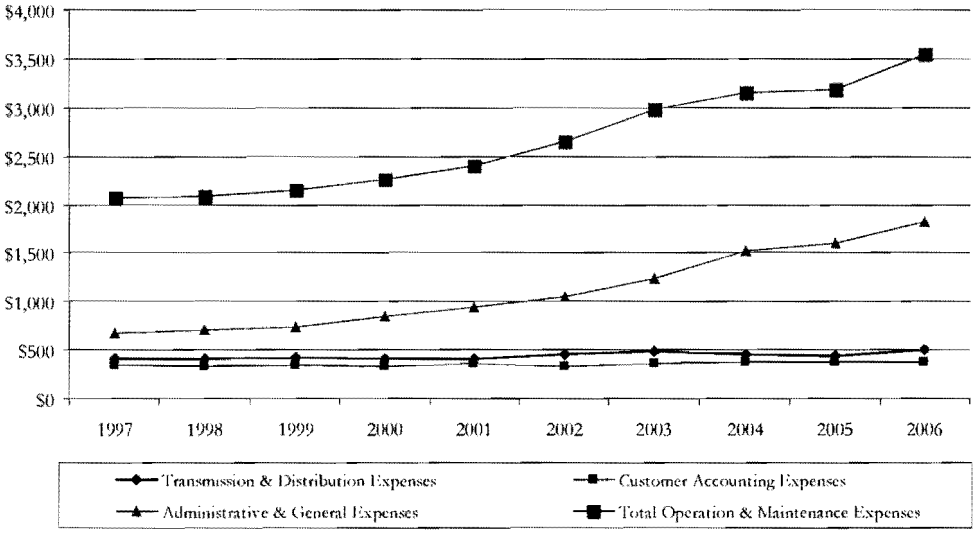
Performance Ratios

Exhibit XIV-20
Performance Ratios

Financial & Operating Data	1997 Penn American (PAWC)	1998 Penn American (PAWC)	1999 Penn American (PAWC)	2000 Penn American (PAWC)	2001 Penn American (PAWC)	2002 Penn American (PAWC)	2003 Penn American (PAWC)	2004 Penn American (PAWC)	2005 Penn American (PAWC)	2006 Penn American (PAWC)	1997-2006 Compound Growth/Loss
Production Expense	$14,453,856	$4,812,315	$4,908,655	$4,676,801	$4,460,017	$7,752,285	$7,689,097	$6,793,175	$7,381,507	5,733,244	-9.67%
Purification Expense	$18,788,159	$28,099,591	$28,784,318	$29,040,717	$30,811,544	$35,073,349	$36,209,603	$33,221,018	$34,241,715	37,841,759	8.01%
Transmission & Distribution Expense	$21,211,501	$20,956,664	$21,582,654	$20,765,738	$20,289,497	$24,055,511	$23,267,164	$23,573,589	$24,014,129	25,866,804	2.21%
Customer Accounting Expense	$17,674,295	$16,405,695	$17,513,011	$16,796,376	$18,457,471	$17,675,097	$17,382,430	$19,517,836	$20,119,161	18,892,361	0.74%
Administrative & General Expense	$34,407,817	$36,247,597	$38,418,676	$42,589,031	$47,847,408	$55,843,120	$60,391,914	$78,121,997	$85,683,241	93,101,420	11.57%
Total Operation & Maintenance Expense	$106,535,628	$106,521,862	$111,207,314	$113,868,663	$121,865,937	$140,399,362	$144,940,208	$161,227,615	$171,439,753	181,475,588	6.03%
Gross Utility Plant in Service	$1,338,075,968	$1,415,981,133	$1,522,773,057	$1,608,020,754	$1,766,649,298	$1,970,710,145	$2,108,923,582	$2,201,791,081	$2,301,664,989	$2,513,927,000	7.18%
Utility Plant in Service Less Depreciation	$1,158,650,999	$1,207,026,112	$1,291,675,886	$1,355,047,587	$1,468,116,457	$1,613,648,666	$1,703,422,931	$1,751,300,272	$1,796,735,724	1,944,628,000	5.86%
Total Average Number of Customers	530,857	534,880	540,525	545,751	563,081	609,110	615,069	614,308	618,340	637,660	2.04%
Total Water Sold (millions of gallons)	51,352	50,951	51,712	50,281	50,711	52,965	48,531	51,257	53,716	51,109	-0.05%
Total Revenue	$258,512,855	$282,059,219	$291,028,590	$305,810,487	$317,341,194	$353,522,504	$355,507,044	$384,402,191	$399,795,739	402,750,000	5.00%
Total Number of Employees	1,089	1,085	1,088	1,032	989	1,004	1,018	824	868	917	-1.87%
Miles of Main in service	7,466	7,560	7,714	7,758	8,040	8,891	9,037	9,108	9,108	9,370	2.53%
Production Expenses per Million Gallons	$281	$94	$95	$93	$88	$146	$158	$133	$137	$112	-9.62%
Purification Expenses per Million Gallons	$366	$552	$557	$578	$608	$662	$746	$648	$637	$740	8.06%
Transmission & Distribution Expenses per Million Gallons	$413	$411	$417	$413	$400	$454	$479	$460	$447	$506	2.26%
Customer Accounting Expenses per Million Gallons	$344	$322	$339	$334	$364	$334	$358	$381	$375	$370	0.79%
Administrative & General Expenses per Million Gallons	$670	$711	$743	$847	$944	$1,054	$1,244	$1,524	$1,595	$1,822	11.63%
Total Operation & Maintenance Expenses per Million Gallons	$2,075	$2,091	$2,151	$2,265	$2,403	$2,651	$2,987	$3,145	$3,192	$3,551	6.09%
Production Expenses per Thousand Customers	$27,227	$8,997	$9,081	$8,569	$7,921	$12,727	$12,501	$11,058	$11,938	$8,991	-11.47%
Purification Expenses per Thousand Customers	$35,392	$52,534	$53,253	$53,212	$54,720	$57,581	$58,871	$54,079	$55,377	$59,345	5.85%
Transmission & Distribution Expenses per Thousand Customers	$39,957	$39,180	$39,929	$38,050	$36,033	$39,493	$37,829	$38,374	$38,836	$40,565	0.17%
Customer Accounting Expenses per Thousand Customers	$33,294	$30,672	$32,400	$30,777	$32,779	$29,018	$28,261	$31,772	$32,537	$29,628	-1.28%
Administrative & General Expenses per Thousand Customers	$64,816	$67,768	$71,077	$78,037	$84,974	$91,680	$98,187	$127,171	$138,570	$146,005	9.34%
Total Operation & Maintenance Expenses per Thousand Customers	$200,686	$199,151	$205,739	$208,646	$216,427	$230,499	$235,649	$262,454	$277,258	$284,596	3.92%
Production Expenses per Mile of Main	$1,936	$637	$636	$603	$555	$872	$851	$746	$810	$612	-11.90%
Purification Expenses per Mile of Main	$2,516	$3,717	$3,731	$3,743	$3,832	$3,945	$4,007	$3,647	$3,760	$4,039	5.34%
Transmission & Distribution Expenses per Mile of Main	$2,841	$2,772	$2,798	$2,677	$2,524	$2,706	$2,575	$2,588	$2,637	$2,761	-0.32%
Customer Accounting Expenses per Mile of Main	$2,367	$2,170	$2,270	$2,165	$2,296	$1,988	$1,923	$2,143	$2,209	$2,016	-1.75%
Administration & General Expenses per Mile of Main	$4,609	$4,795	$4,980	$5,490	$5,951	$6,281	$6,683	$8,577	$9,407	$9,936	8.82%
Total Operation & Maintenance Expenses per Mile of Main	$14,269	$14,090	$14,416	$14,678	$15,157	$15,791	$16,039	$17,702	$18,823	$19,368	3.42%
Total Average Number of Customers per Employee	487	493	497	529	569	607	604	746	712	695	3.98%
Gross Utility Plant in Service per Total Average Number of Customers	$2,521	$2,647	$2,817	$2,946	$3,137	$3,235	$3,429	$3,584	$3,722	$3,942	5.04%

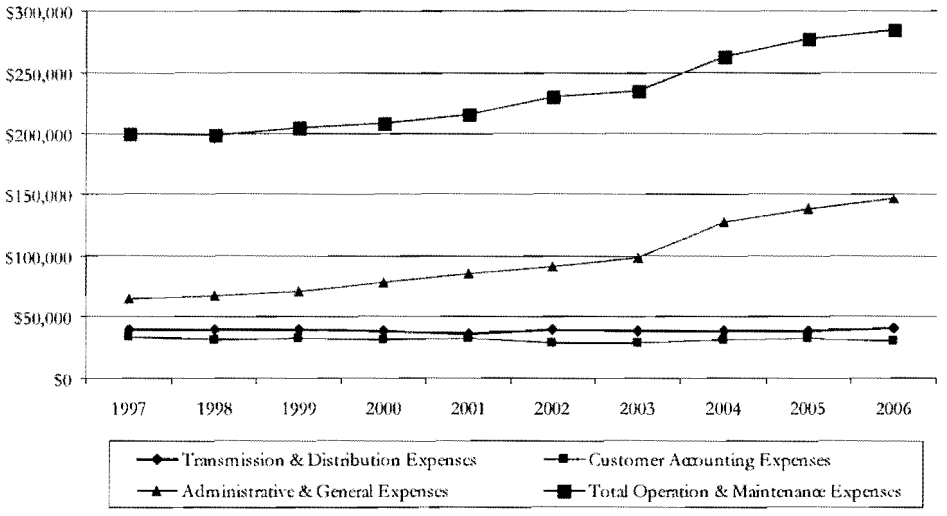
Performance Ratios per Million Gallons

Exhibit XIV-21
Performance Ratios per Million Gallons



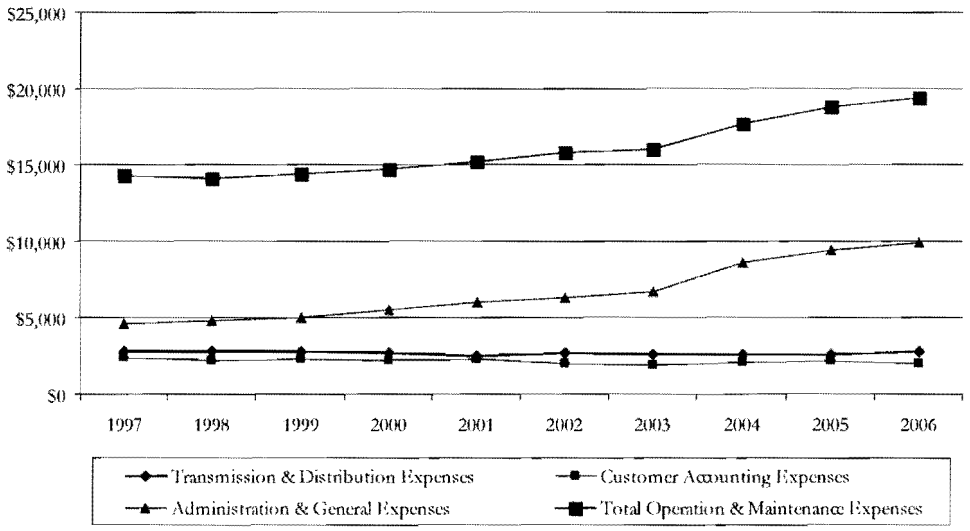
Performance Ratios per One Thousand Customers

Exhibit XIV-22
Performance Ratios per One Thousand Customers



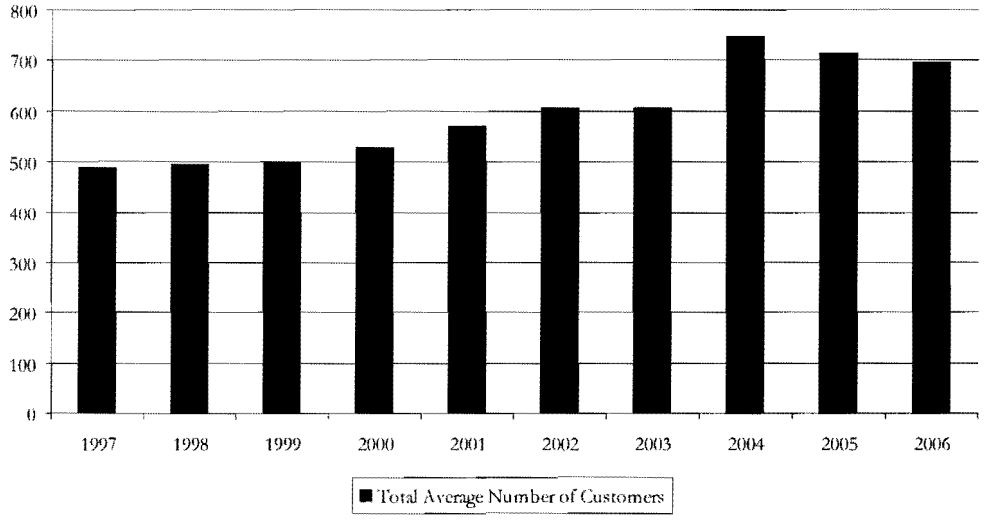
Performance Ratios per Mile of Main

Exhibit XIV-23
Performance Ratios per Mile of Main



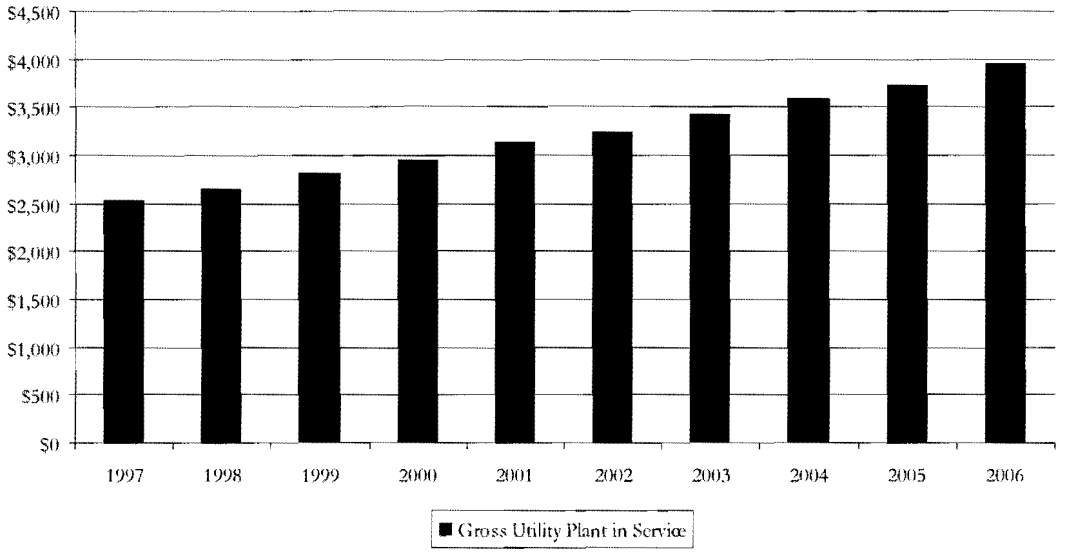
Performance Ratios - Average Number of Customers per Employee

Exhibit XIV-24
Performance Ratios – Average Number of Customers per Employee



Performance Ratios - Gross Utility Plant in Service per Average Number of Customers

Exhibit XIV-25
Performance Ratios – Gross Utility Plant in Service per Average Number of Customers



B. Section 2 – Comparative

This section provides a comparative analysis of Pennsylvania-American Water Company (PAWC) to a select group of appropriate water utilities over a five-year period (2002 to 2006). These comparators include:

- Non-American Water companies (individually and subtotaled)
  - Aqua Pennsylvania (Aqua PA)
  - Aquarian Connecticut (Aquarian CT)
  - San Jose Water Corporation
- American Water companies (individually and subtotaled)
  - Elizabethtown Water
  - Missouri-American Water Company
  - New Jersey-American Company

This section of the report uses NAWC as its major source of data and presents the following statistics for the years 2002 through 2006.

- Total net plant in service
- Water sales by volume (millions of gallons)
- Operating revenue
- Total average number of customers (year-end)
- Total employees (year-end)
- Total operation and maintenance expense
- Miles of main in service
- Performance ratio expense

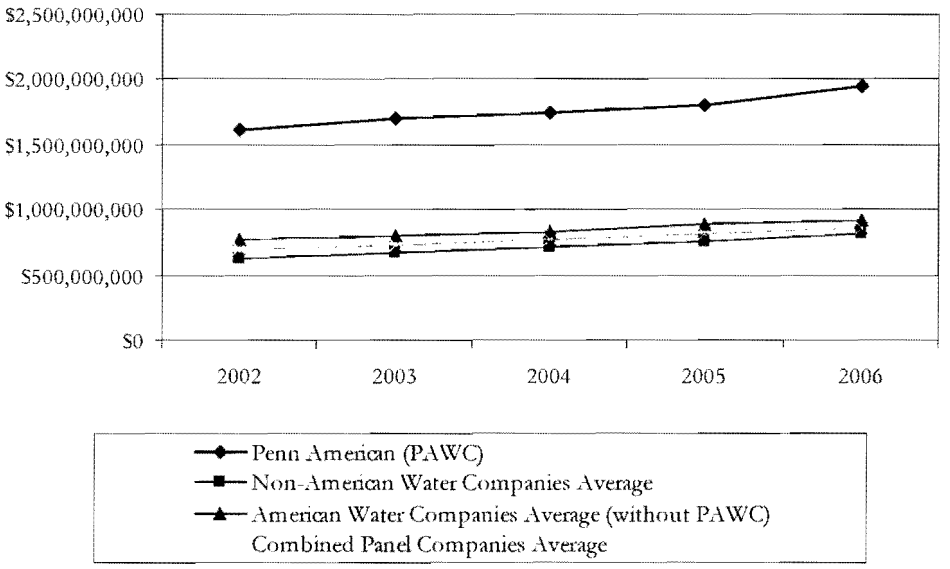
Total Net Plant in Service

Exhibit XIV-26
Utility Plant in Service Less Depreciation

Utility Plant in Service Less Depreciation	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)**	**$1,613,648,666**	**$1,703,422,931**	**$1,751,300,272**	**$1,796,735,724**	**$1,944,628,000**	**4.77%**
Aqua Penn/Philadelphia Suburban	$1,038,525,245	$1,109,141,275	$1,183,592,362	$1,279,583,788	$1,398,446,192	7.72%
Aquarion Connecticut	$448,599,816	$473,764,056	$508,357,118	$527,708,953	$547,521,421	5.11%
San Jose Water Corp	$374,623,025	$404,723,802	$425,773,766	$449,597,107	$479,947,705	6.39%
Non-American Water Companies Average	**$620,582,695**	**$662,543,044**	**$705,907,749**	**$752,296,616**	**$808,638,439**	**6.84%**
Elizabethtown Water**	$698,290,304	$715,733,304	$707,210,682	$785,216,750	$801,922,000	3.52%
Missouri American*	$683,132,066	$691,813,490	$732,899,739	$776,284,568	$862,399,000	6.00%
New Jersey American	$941,448,916	$995,536,752	$1,030,349,593	$1,098,607,693	$1,098,350,995	3.93%
American Water Companies Average (without PAWC)	**$774,290,429**	**$801,027,849**	**$823,486,671**	**$886,703,004**	**$920,890,665**	**4.43%**
Combined Panel Companies Average	**$697,436,562**	**$731,785,447**	**$764,697,210**	**$819,499,810**	**$864,764,552**	**5.52%**

* 2002 data from filed MO PSC Annual Report, not NAWC
** 2006 Elizabethtown Water and PAWC data from Data Request 620 response, not NAWC

Utility Plant in Service Less Depreciation

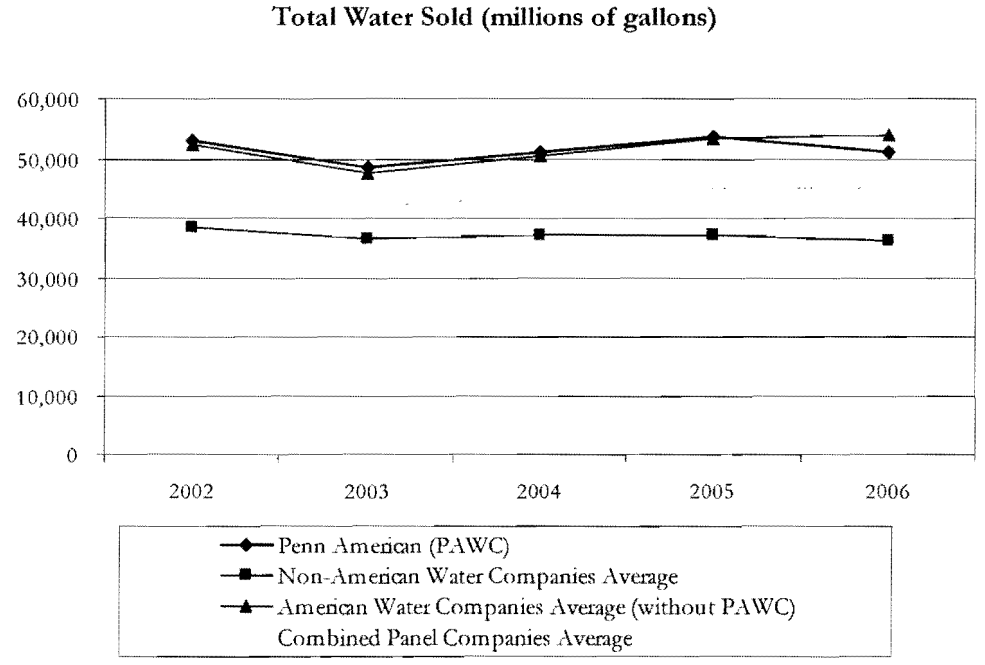


Water Sales by Volume (millions of gallons)

Exhibit XIV-27
Total Water Sold (millions of gallons)

Total Water Sold (millions of gallons)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**52,965**	**48,531**	**51,257**	**53,716**	**51,109**	**-0.89%**
Aqua Penn/Philladelphia Suburban	39,861	39,077	38,465	39,933	38,659	-0.76%
Aquarion Connecticut	26,287	23,953	24,473	26,129	24,493	-1.75%
San Jose Water Corp	48,861	46,632	48,186	45,318	45,592	-1.72%
Non-American Water Companies Average	**38,336**	**36,554**	**37,041**	**37,127**	**36,248**	**-1.39%**
Elizabethtown Water*	46,785	42,735	42,839	44,870	42,430	-2.41%
Missouri American**	64,840	57,811	62,646	67,253	72,180	2.72%
New Jersey American*	45,629	42,123	45,886	47,923	47,664	1.10%
American Water Companies Average (without PAWC)	**52,418**	**47,556**	**50,457**	**53,349**	**54,091**	**0.79%**
Combined Panel Companies Average	**45,377**	**42,055**	**43,749**	**45,238**	**45,170**	**-0.11%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



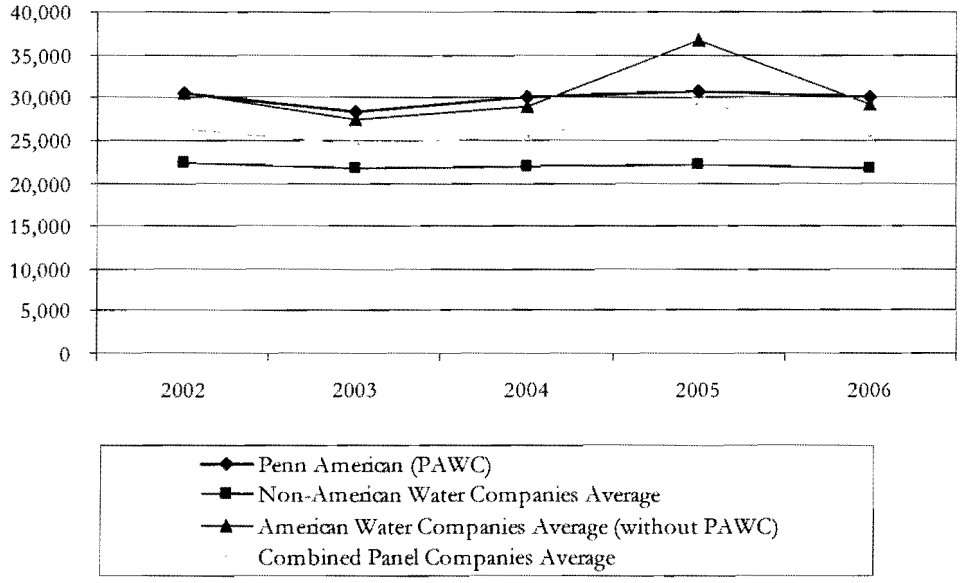
Residential Water Sold

Exhibit XIV-28
Residential Water Sold (millions of gallons)

Residential Water Sold (millions of gallons)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**30,559**	**28,268**	**30,137**	**30,769**	**29,949**	**-0.50%**
Aqua Penn/Philladelphia Suburban	22,651	22,497	22,025	23,209	21,946	-0.79%
Aquarion Connecticut	15,222	14,706	15,069	16,499	15,990	1.24%
San Jose Water Corp	29,173	27,754	28,824	26,701	26,892	-2.01%
Non-American Water Companies Average	**22,349**	**21,652**	**21,973**	**22,136**	**21,609**	**-0.84%**
Elizabethtown Water*	26,087	23,855	24,114	29,460	17,812	-9.10%
Missouri American**	38,999	34,548	36,673	38,960	41,851	1.78%
New Jersey American*	26,126	23,817	26,181	41,477	27,553	1.34%
American Water Companies Average (without PAWC)	**30,404**	**27,407**	**28,989**	**36,632**	**29,072**	**-1.11%**
Combined Panel Companies Average	**26,376**	**24,530**	**25,481**	**29,384**	**25,341**	**-1.00%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Residential Water Sold (millions of gallons)

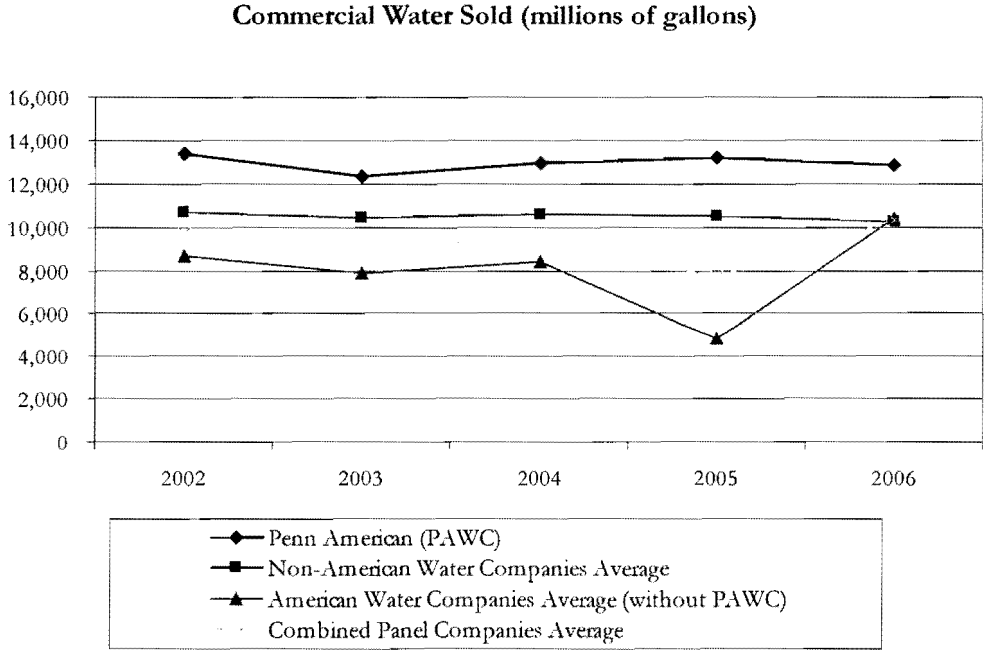


Commercial Water Sold

Exhibit XIV-29
Commercial Water Sold (millions of gallons)

Commercial Water Sold (millions of gallons)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**13,351**	**12,316**	**12,917**	**13,236**	**12,856**	**-0.94%**
Aqua Penn/Philladelphia Suburban	11,145	10,754	10,692	10,973	10,802	-0.78%
Aquarion Connecticut	5,364	5,401	5,635	5,706	4,904	-2.22%
San Jose Water Corp	15,532	15,013	15,385	14,890	14,976	-0.91%
Non-American Water Companies Average	**10,680**	**10,389**	**10,571**	**10,523**	**10,227**	**-1.08%**
Elizabethtown Water*	0	0	0	0	4,166	N/A
Missouri American**	12,875	11,787	12,533	14,474	14,488	2.99%
New Jersey American*	13,059	11,702	12,631	0	12,504	-1.08%
American Water Companies Average (without PAWC)	**8,645**	**7,830**	**8,388**	**4,825**	**10,386**	**4.69%**
Combined Panel Companies Average	**9,663**	**9,110**	**9,479**	**7,674**	**10,307**	**1.63%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

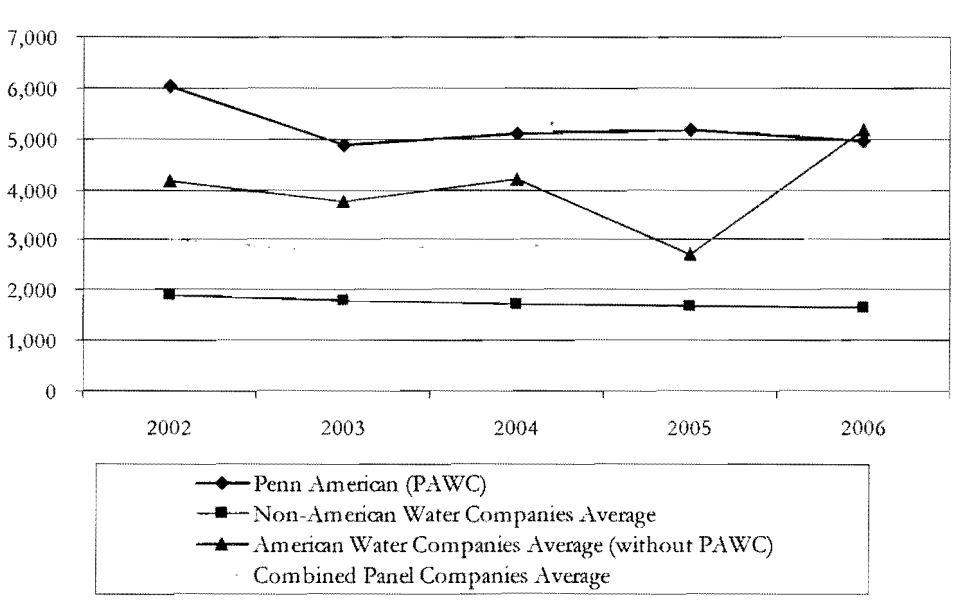


Industrial Water Sold

Exhibit XIV-30
Industrial Water Sold (millions of gallons)

Industrial Water Sold (millions of gallons)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**6,031**	**4,890**	**5,096**	**5,157**	**4,966**	**-4.74%**
Aqua Penn/Philladelphia Suburban	3,853	3,702	3,594	3,407	3,546	-2.05%
Aquarion Connecticut	1,384	1,266	1,191	1,265	1,061	-6.43%
San Jose Water Corp	412	366	375	320	340	-4.69%
Non-American Water Companies Average	**1,883**	**1,778**	**1,720**	**1,664**	**1,649**	**-3.26%**
Elizabethtown Water*	3,668	3,843	3,906	0	5,311	9.69%
Missouri American**	8,229	6,885	8,250	8,160	9,799	4.46%
New Jersey American*	603	547	516	0	429	-8.16%
American Water Companies Average (without PAWC)	**4,167**	**3,758**	**4,224**	**2,720**	**5,180**	**5.59%**
Combined Panel Companies Average	**3,025**	**2,768**	**2,972**	**2,192**	**3,414**	**3.07%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



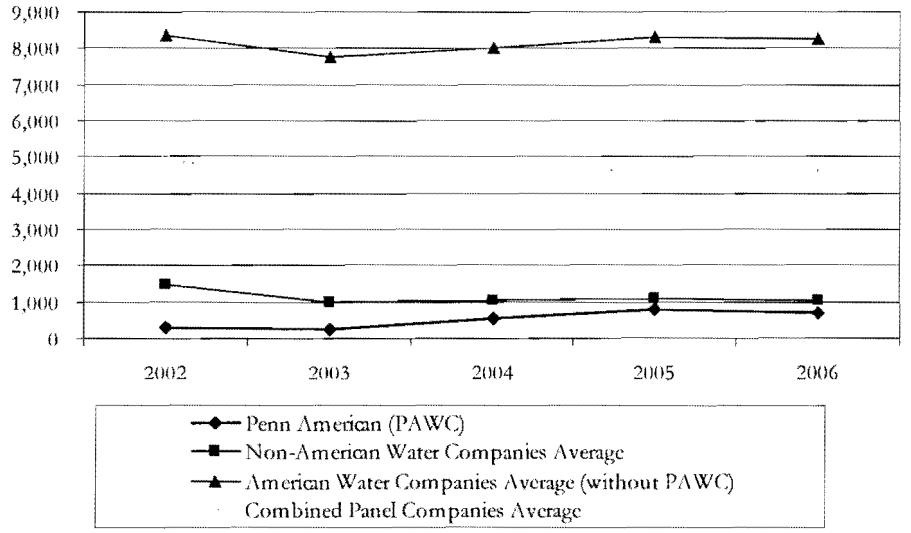
Wholesale Water Sold

Exhibit XIV-31
Wholesale Water Sold (millions of gallons)

Wholesale Water Sold (millions of gallons)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**308**	**238**	**555**	**783**	**713**	**23.35%**
Aqua Penn/Philladelphia Suburban	935	1,027	991	1,088	1,126	4.76%
Aquarion Connecticut	3,259	1,734	1,800	1,875	1,704	-14.97%
San Jose Water Corp	293	250	250	232	230	-5.87%
Non-American Water Companies Average	**1,496**	**1,004**	**1,014**	**1,065**	**1,020**	**-9.13%**
Elizabethtown Water*	17,030	15,037	14,819	15,410	14,731	-3.56%
Missouri American**	3,634	3,589	4,024	4,409	4,677	6.51%
New Jersey American*	4,476	4,754	5,193	5,132	5,381	4.71%
American Water Companies Average (without PAWC)	**8,380**	**7,793**	**8,012**	**8,317**	**8,263**	**-0.35%**
Combined Panel Companies Average	**4,938**	**4,399**	**4,513**	**4,691**	**4,642**	**-1.54%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Wholesale Water Sold (millions of gallons)



PAWC's wholesale water sold increased at a compound growth rate over 23%, primarily due to the fact that in 2004 PAWC entered into an agreement with West Allegheny County Municipal Authority (WACMA) for the purchase of water to resell. In 2005, a full year of revenue and usage was recorded according to the terms of the agreement.

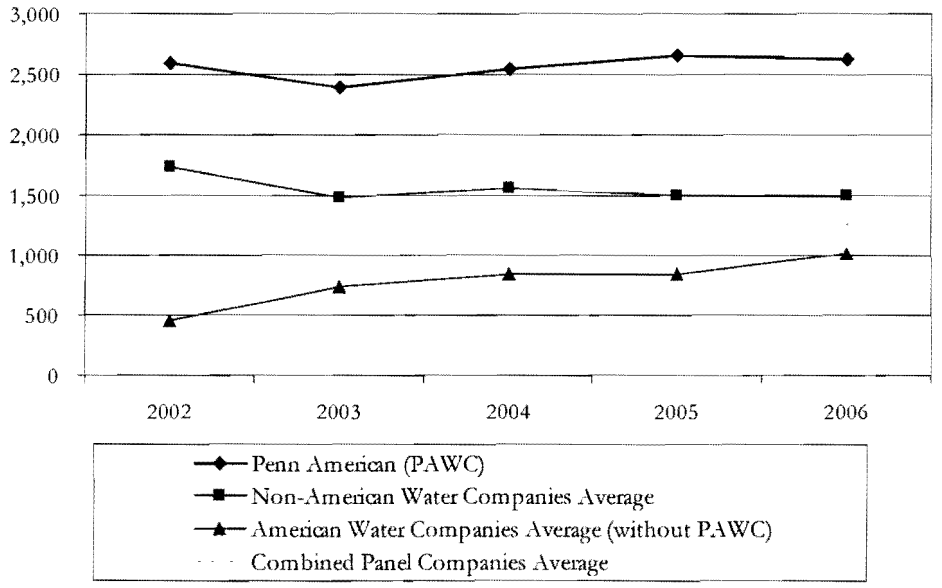
Governmental Authority Water Sold

Exhibit XIV-32
Governmental Authority Water Sold (millions of gallons)

Governmental Authority Water Sold (millions of gallons	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**2,600**	**2,393**	**2,552**	**2,659**	**2,625**	**0.24%**
Aqua Penn/Philladelphia Suburban	1,187	979	1,080	1,185	1,186	-0.02%
Aquarion Connecticut	1,058	846	778	784	834	-5.77%
San Jose Water Corp	2,959	2,613	2,810	2,530	2,467	-4.44%
Non-American Water Companies Average	**1,735**	**1,479**	**1,556**	**1,500**	**1,496**	**-3.64%**
Elizabethtown Water*	0	0	0	0	379	N/A
Missouri American**	0	989	1,166	1,239	1,349	10.79%
New Jersey American*	1,365	1,202	1,365	1,314	1,337	-0.52%
American Water Companies Average (without PAWC)	**455**	**730**	**844**	**851**	**1,022**	**22.41%**
Combined Panel Companies Average	**1,095**	**1,105**	**1,200**	**1,175**	**1,259**	**3.55%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC and Compound Growth/Loss calculated only on 2003-2006

Governmental Authority Water Sold (millions of gallons)



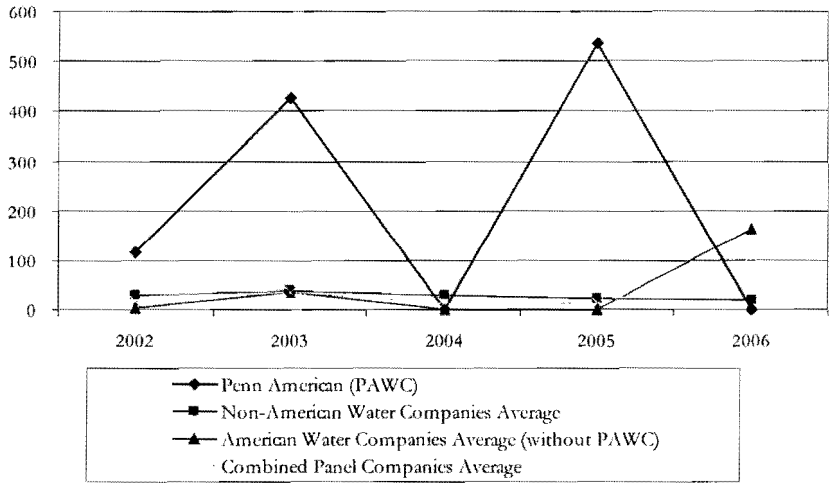
Fire Service Water Sold

Exhibit XIV-33
Fire Service Water Sold (millions of gallons)

Fire Service Water Sold (millions of gallons)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**116**	**426**	**0**	**536**	**0**	**-100.00%**
Aqua Penn/Philladelphia Suburban	90	118	83	71	53	-12.40%
Aquarion Connecticut	0	0	0	0	0	0.00%
San Jose Water Corp	0	0	0	0	0	0.00%
Non-American Water Companies Average	**30**	**39**	**28**	**24**	**18**	**-12.40%**
Elizabethtown Water*	0	0	0	0	31	N/A
Missouri American***	5	1	0	0	0	-100.00%
New Jersey American**	0	101	0	0	460	64.92%
American Water Companies Average (without PAWC)	**2**	**34**	**0**	**0**	**164**	**214.80%**
Combined Panel Companies Average	**16**	**37**	**14**	**12**	**91**	**54.69%**

* 2006 Elizabethtown Water and PAWC data from Data Request 620 response, not NAWC
** 2006 New Jersey American data from Data Request 620 response, not NAWC and Compound Growth/Loss calculated only on 2003-2006
*** 2002 data from filed MO PSC Annual Report, not NAWC

Fire Service Water Sold (millions of gallons)



As fire service is a flat rate, PAWC does not typically report usage for this bill class, although figures were provided for 2002, 2003, and 2005.

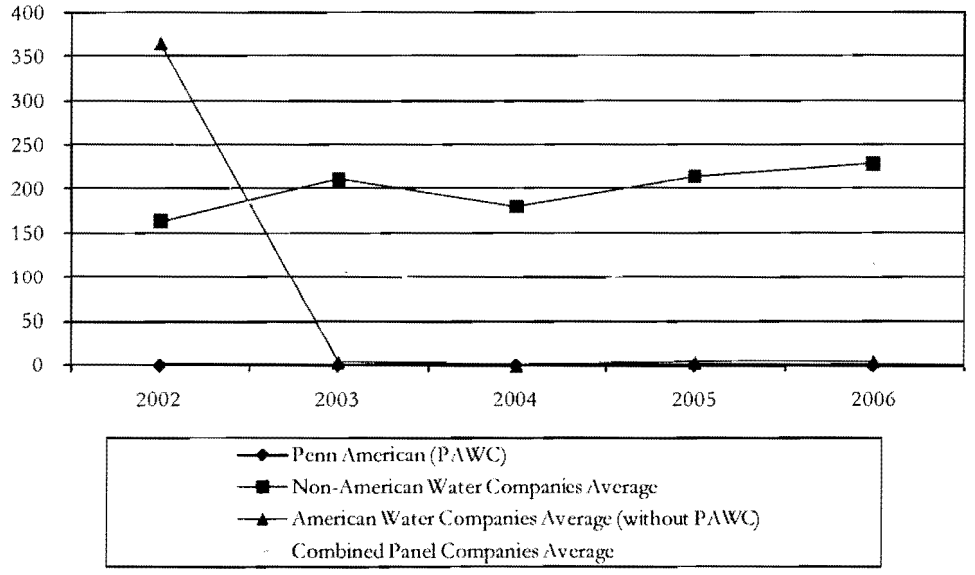
Other Water Sold

Exhibit XIV-34
Other Water Sold (millions of gallons)

Other Water Sold (millions of gallons)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**0**	**0**	**0**	**0**	**0**	**0.00%**
Aqua Penn/Philladelphia Suburban	0	0	0	0	0	0.00%
Aquarion Connecticut	0	0	0	0	0	0.00%
San Jose Water Corp	492	636	542	645	687	8.70%
Non-American Water Companies Average	**164**	**212**	**181**	**215**	**229**	**8.70%**
Elizabethtown Water*	0	0	0	0	0	0.00%
Missouri American**	1,098	12	0	11	16	-65.26%
New Jersey American*	0	0	0	0	0	0.00%
PAWC)	**366**	**4**	**0**	**4**	**5**	**-65.26%**
Combined Panel Companies Average	**265**	**108**	**90**	**109**	**117**	**-18.46%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Other Water Sold (millions of gallons)



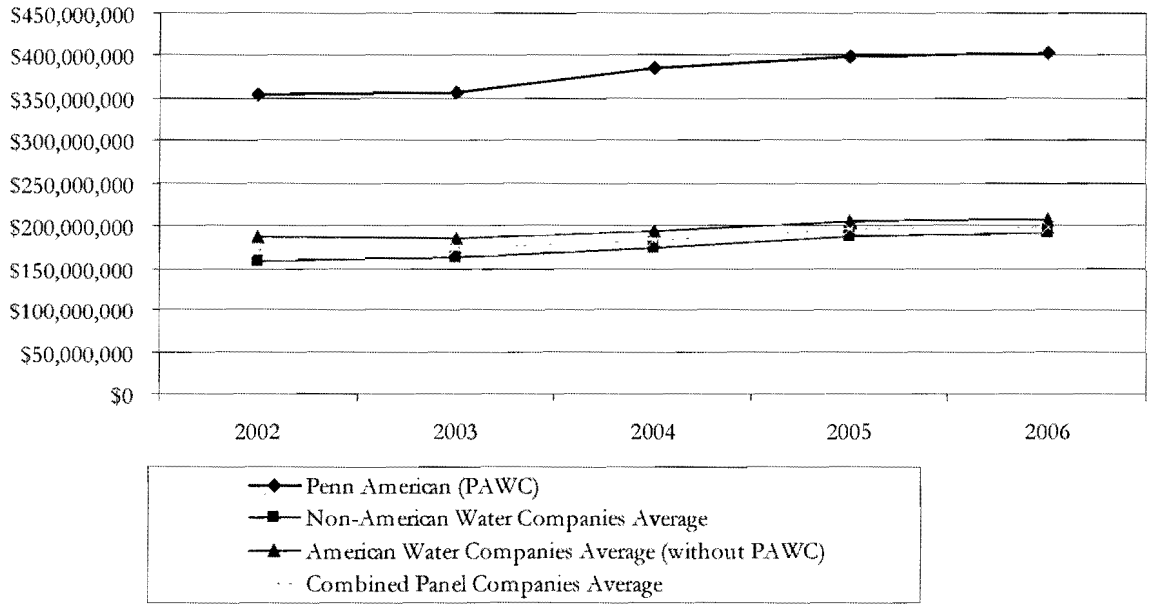
Operating Revenue

Exhibit XIV-35
Total Operating Revenue ($'s)

Total Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**353,522,504**	**355,507,044**	**384,402,191**	**399,795,739**	**402,750,000**	**3.31%**
Aqua Penn/Philladelphia Suburban	218,240,778	234,582,061	247,680,460	269,039,760	282,947,426	6.71%
Aquarion Connecticut	110,034,624	109,862,116	110,915,907	116,235,620	113,173,791	0.71%
San Jose Water Corp	143,092,488	146,131,296	161,757,237	175,524,319	180,619,665	6.00%
Non-American Water Companies Average	**157,122,630**	**163,525,158**	**173,451,201**	**186,933,233**	**192,246,961**	**5.17%**
Elizabethtown Water*	155,066,981	155,329,841	158,017,899	165,203,157	166,592,000	0.00%
Missouri American**	161,986,367	156,996,994	154,968,916	164,047,256	170,853,331	1.34%
New Jersey American*	244,347,075	241,543,126	266,661,506	282,658,077	281,305,000	3.58%
American Water Companies Average (without PAWC)	**187,133,474**	**184,623,320**	**193,216,107**	**203,969,497**	**206,250,110**	**2.46%**
Combined Panel Companies Average	**172,128,052**	**174,074,239**	**183,333,654**	**195,451,365**	**199,248,536**	**3.73%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Total Revenue ($'s)

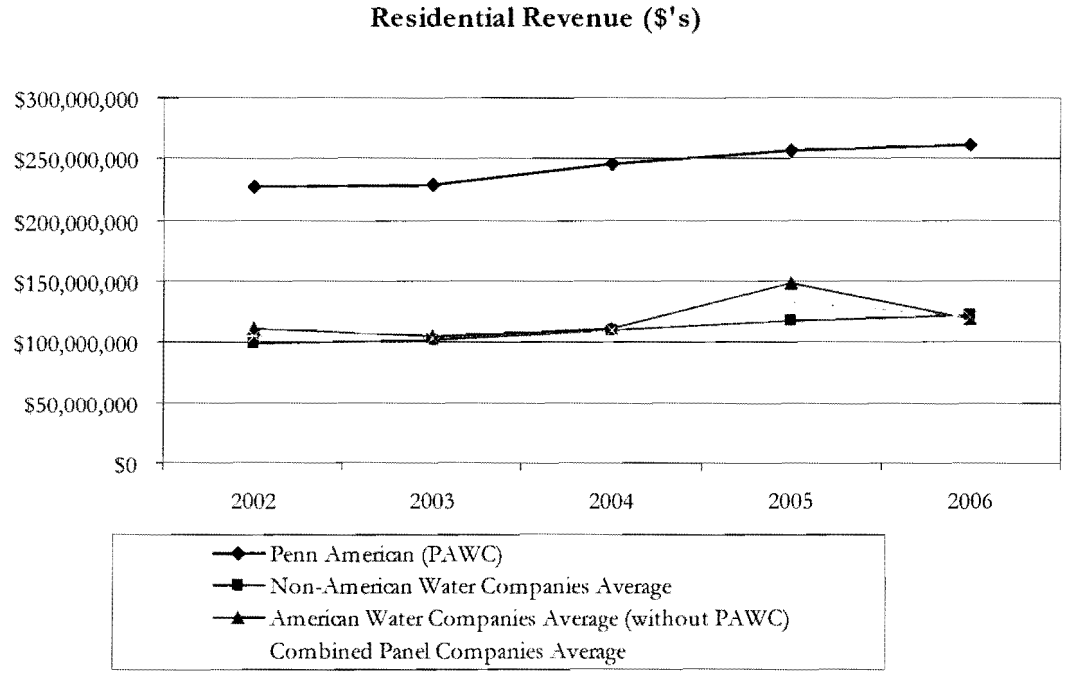


Residential Revenue

Exhibit XIV-36
Residential Revenue ($'s)

Residential Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**226,575,152**	**228,809,241**	**246,333,788**	**257,225,435**	**261,751,000**	**3.67%**
Aqua Penn/Philladelphia Suburban	138,149,783	145,717,993	156,854,891	166,959,090	179,192,387	6.72%
Aquarion Connecticut	70,954,552	69,608,508	70,275,687	75,346,027	72,340,512	0.48%
San Jose Water Corp	87,801,429	89,805,202	99,981,981	109,732,604	113,280,900	6.58%
Non-American Water Companies Average	**98,968,588**	**101,710,568**	**109,037,520**	**117,345,907**	**121,604,600**	**5.28%**
Elizabethtown Water*	100,780,604	87,616,431	87,347,322	116,175,270	78,616,000	-6.02%
Missouri American**	102,272,550	96,570,086	98,165,040	103,366,532	106,299,676	0.97%
New Jersey American*	132,905,402	131,475,571	147,667,230	226,629,471	170,452,000	6.42%
American Water Companies Average (without PAWC)	**111,986,185**	**105,220,696**	**111,059,864**	**148,723,758**	**118,455,892**	**1.41%**
Combined Panel Companies Average	**105,477,387**	**103,465,632**	**110,048,692**	**133,034,832**	**120,030,246**	**3.28%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

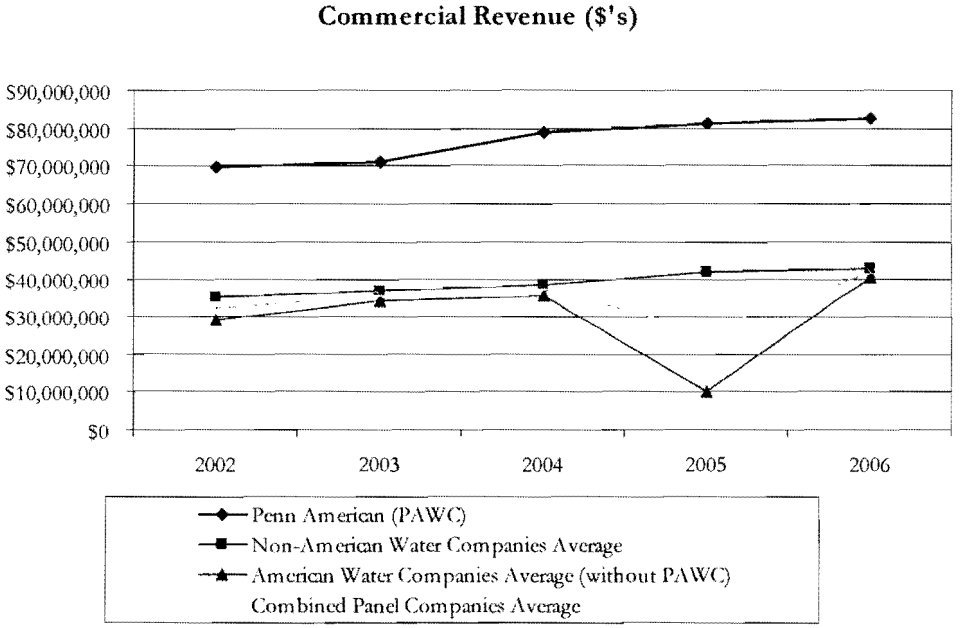


Commercial Revenue

Exhibit XIV-37
Commercial Revenue ($'s)

Commercial Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**69,568,695**	**71,054,559**	**78,722,592**	**81,202,972**	**82,799,000**	**4.45%**
Aqua Penn/Philladelphia Suburban	45,010,812	49,475,672	50,839,751	57,257,270	58,935,102	6.97%
Aquarion Connecticut	17,307,059	17,494,575	17,398,458	17,414,498	17,007,953	-0.43%
San Jose Water Corp	42,982,977	44,315,153	48,343,235	51,886,818	53,132,415	5.44%
Non-American Water Companies Average	**35,100,283**	**37,095,133**	**38,860,481**	**42,186,195**	**43,025,157**	**5.22%**
Elizabethtown Water**	0	15,178,440	17,150,554	0	19,118,000	7.91%
Missouri American***	28,978,736	30,163,477	27,012,598	29,940,877	32,850,402	3.18%
New Jersey American*	58,700,389	57,123,111	63,126,506	0	69,589,000	4.35%
American Water Companies Average (without PAWC)	**29,226,375**	**34,155,009**	**35,763,219**	**9,980,292**	**40,519,134**	**8.51%**
Combined Panel Companies Average	**32,163,329**	**35,625,071**	**37,311,850**	**26,083,244**	**41,772,145**	**6.75%**

* 2006 New Jersey American and PAWC data from Data Request 620 response, not NAWC
** 2006 Elizabethtown Water data from Data Request 620 response, not NAWC and Compound Growth/Loss calculated only on 2003-2006
*** 2002 data from filed MO PSC Annual Report, not NAWC



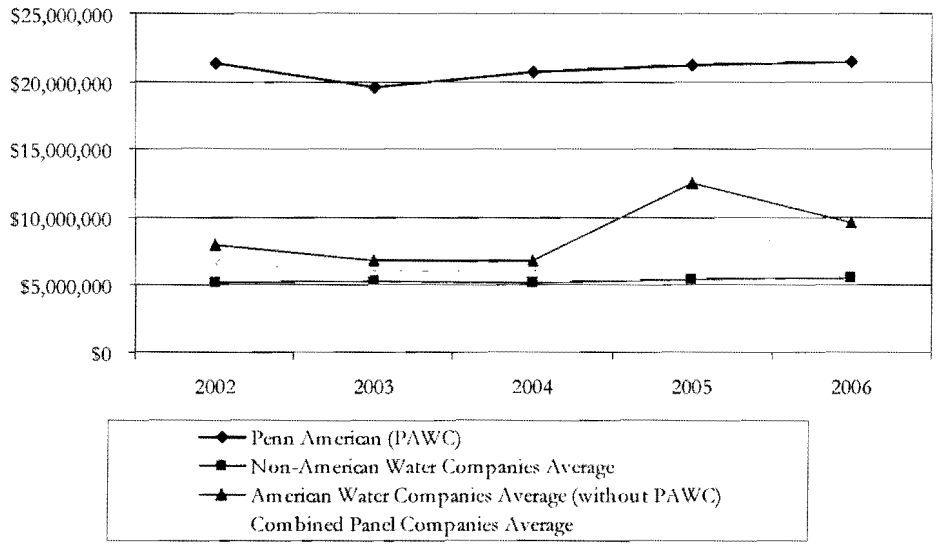
Industrial Revenue

Exhibit XIV-38
Industrial Revenue ($'s)

Industrial Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**21,311,584**	**19,563,868**	**20,684,995**	**21,232,096**	**21,417,000**	**0.12%**
Aqua Penn/Philladelphia Suburban	11,980,382	12,644,717	12,227,340	12,922,921	13,539,623	3.11%
Aquarion Connecticut	2,584,270	2,426,645	2,391,047	2,269,054	2,145,675	-4.54%
San Jose Water Corp	1,059,658	979,392	1,082,661	1,041,561	1,114,548	1.27%
Non-American Water Companies Average	**5,208,103**	**5,350,251**	**5,233,683**	**5,411,179**	**5,599,949**	**1.83%**
Elizabethtown Water*	9,387,200	6,975,157	7,573,325	26,979,047	16,272,000	14.74%
Missouri American**	11,672,626	10,911,841	10,551,463	10,383,853	10,432,773	-2.77%
New Jersey American*	2,622,102	2,588,938	2,352,845	0	2,108,000	-5.31%
American Water Companies Average (without PAWC)	**7,893,976**	**6,825,312**	**6,825,878**	**12,454,300**	**9,604,258**	**5.02%**
Combined Panel Companies Average	**6,551,040**	**6,087,782**	**6,029,780**	**8,932,739**	**7,602,103**	**3.79%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Industrial Revenue ($'s)



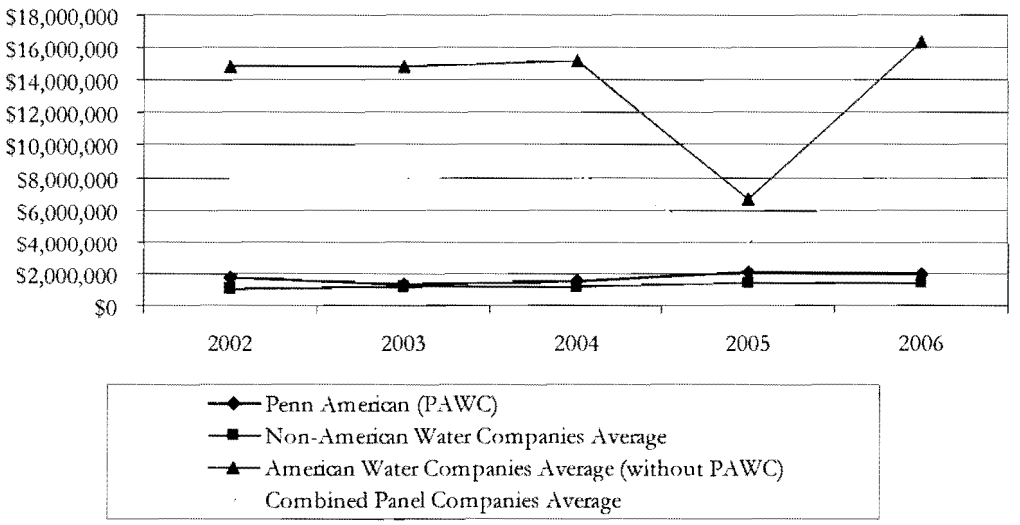
PAWC experienced only a 0.12% compound growth over the time period 2002 to 2006, as it has not added any large industrial customers, plus it has seen a decrease in usage as well as the loss of several large industrial customers.

Wholesale Revenue

Exhibit XIV-39
Wholesale Revenue ($'s)

Wholesale Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**1,757,631**	**1,249,264**	**1,535,296**	**2,085,539**	**1,972,000**	**2.92%**
Aqua Penn/Philladelphia Suburban	620,473	509,652	403,382	589,372	679,978	2.32%
Aquarion Connecticut	1,896,526	2,293,835	2,444,049	2,920,422	2,775,900	9.99%
San Jose Water Corp	505,977	536,889	607,947	784,479	887,572	15.08%
Non-American Water Companies Average	**1,007,659**	**1,113,459**	**1,151,793**	**1,431,424**	**1,447,817**	**9.48%**
Elizabethtown Water*	25,635,466	25,647,650	25,442,775	0	26,368,000	0.71%
Missouri American**	6,745,287	6,653,166	6,968,543	6,716,118	6,891,797	0.54%
New Jersey American*	12,079,236	12,313,726	13,237,484	13,113,566	15,721,000	6.81%
American Water Companies Average (without PAWC)	**14,819,996**	**14,871,514**	**15,216,267**	**6,609,895**	**16,326,932**	**2.45%**
Combined Panel Companies Average	**7,913,828**	**7,992,486**	**8,184,030**	**4,020,660**	**8,887,375**	**2.94%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



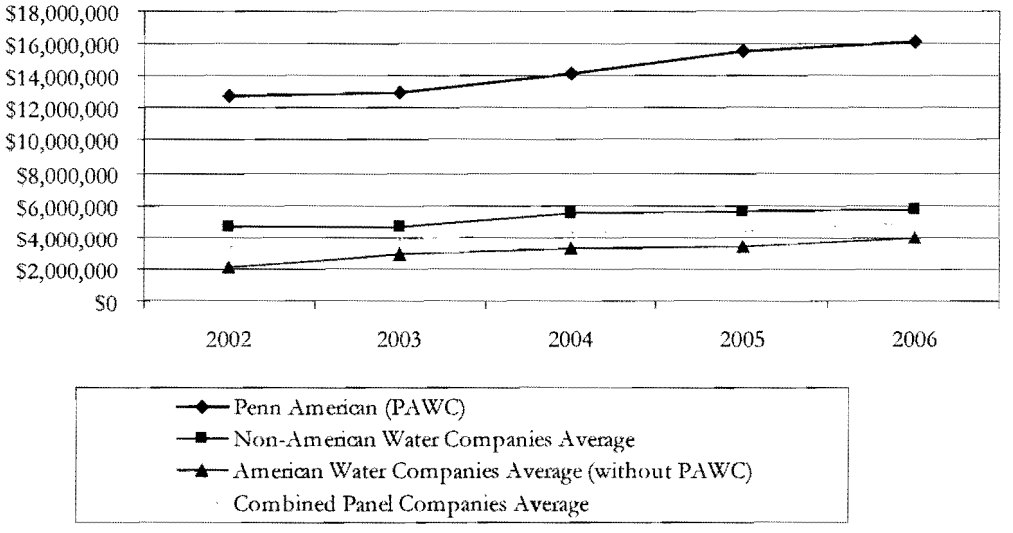
Governmental Authority Revenue

Exhibit XIV-40
Governmental Authority Revenue ($'s)

Governmental Authority Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**12,728,972**	**12,960,136**	**14,133,775**	**15,574,261**	**16,115,000**	**6.07%**
Aqua Penn/Philladelphia Suburban	2,792,419	3,419,390	4,643,443	5,082,333	5,382,712	17.83%
Aquarion Connecticut	2,983,764	2,906,646	2,963,352	2,940,655	2,907,154	-0.65%
San Jose Water Corp	8,173,522	7,856,318	8,832,308	8,903,231	8,903,340	2.16%
Non-American Water Companies Average	**4,649,902**	**4,727,451**	**5,479,701**	**5,642,073**	**5,731,069**	**5.37%**
Elizabethtown Water*	0	0	0	0	1,929,000	0.00%
Missouri American**	0	2,680,872	2,717,984	2,850,402	3,107,759	5.00%
New Jersey American*	6,414,923	6,155,438	6,949,236	7,167,160	6,889,000	1.80%
American Water Companies Average (without PAWC)	**2,138,308**	**2,945,437**	**3,222,407**	**3,339,187**	**3,975,253**	**16.77%**
Combined Panel Companies Average	**3,394,105**	**3,836,444**	**4,351,054**	**4,490,630**	**4,853,161**	**9.35%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC and Compound Growth/Loss calculated only on 2003-2006

Governmental Authority Revenue ($'s)

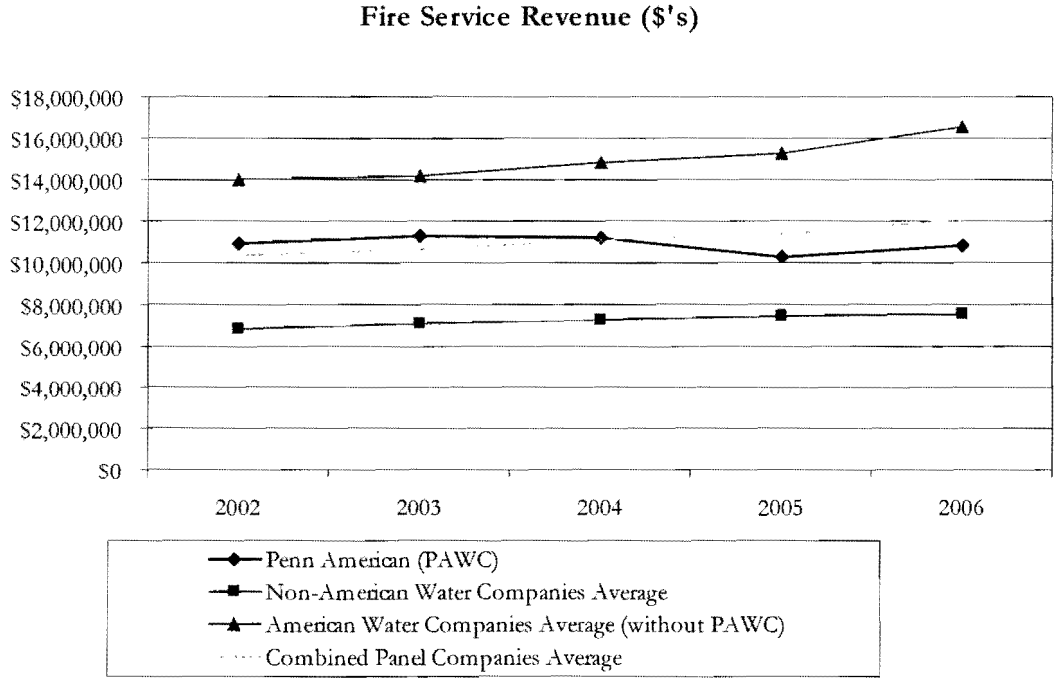


Fire Service Revenue

Exhibit XIV-41
Fire Service Revenue ($'s)

Fire Service Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**10,910,570**	**11,294,979**	**11,160,570**	**10,274,507**	**10,803,000**	**-0.25%**
Aqua Penn/Philladelphia Suburban	5,471,009	5,593,844	5,680,321	5,786,109	5,912,558	1.96%
Aquarion Connecticut	13,742,012	14,361,761	14,644,326	14,658,226	14,752,079	1.79%
San Jose Water Corp	1,267,226	1,306,705	1,521,510	1,961,253	2,046,274	12.73%
Non-American Water Companies Average	**6,826,749**	**7,087,437**	**7,282,052**	**7,468,529**	**7,570,304**	**2.62%**
Elizabethtown Water*	19,197,200	19,842,508	20,438,920	20,968,166	23,662,000	5.37%
Missouri American**	7,800,435	7,857,952	7,588,461	7,936,945	8,403,144	1.88%
New Jersey American*	14,875,054	14,803,801	16,507,013	16,916,808	17,497,000	4.14%
American Water Companies Average (without PAWC)	**13,957,563**	**14,168,087**	**14,844,798**	**15,273,973**	**16,520,715**	**4.30%**
Combined Panel Companies Average	**10,392,156**	**10,627,762**	**11,063,425**	**11,371,251**	**12,045,509**	**3.76%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



Other Revenue

Exhibit XIV-42
Other Revenue ($'s)

Other Revenue ($'s)	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**5,770,793**	**6,076,508**	**6,380,528**	**7,101,623**	**7,893,000**	**8.14%**
Aqua Penn/Philladelphia Suburban	14,215,900	17,220,793	17,031,332	20,442,665	19,305,066	7.95%
Aquarion Connecticut	566,441	770,146	798,988	686,738	1,244,518	21.75%
San Jose Water Corp	438,552	426,139	520,062	491,581	520,433	4.37%
Non-American Water Companies Average	**5,073,631**	**6,139,026**	**6,116,794**	**7,206,995**	**7,023,339**	**8.47%**
Elizabethtown Water**	66,511	69,655	65,004	1,080,674	(515,000)	150.94%
Missouri American***	2,691,528	211,374	1,897,157	2,556,833	183,279	-48.92%
New Jersey American*	(4,757)	165,465	197,754	(511,585)	(1,176,000)	N/A
American Water Companies Average (without PAWC)	**917,761**	**148,831**	**719,972**	**1,041,974**	**(502,574)**	**4.28%**
Combined Panel Companies Average	**2,995,696**	**3,143,929**	**3,418,383**	**4,124,484**	**3,260,383**	**2.14%**

* 2006 New Jersey American and PAWC data from Data Request 620 response, not NAWC
** 2006 Elizabethtown Water data from Data Request 620 response, not NAWC, and Compound Growth/Loss calculated only on 2002-2005
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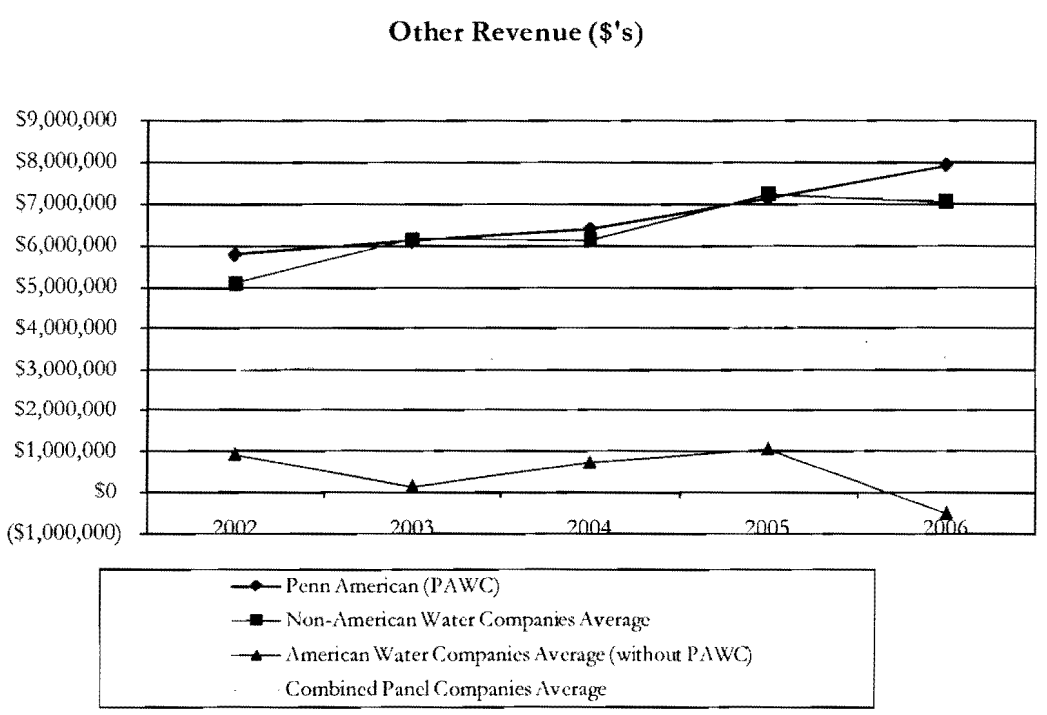
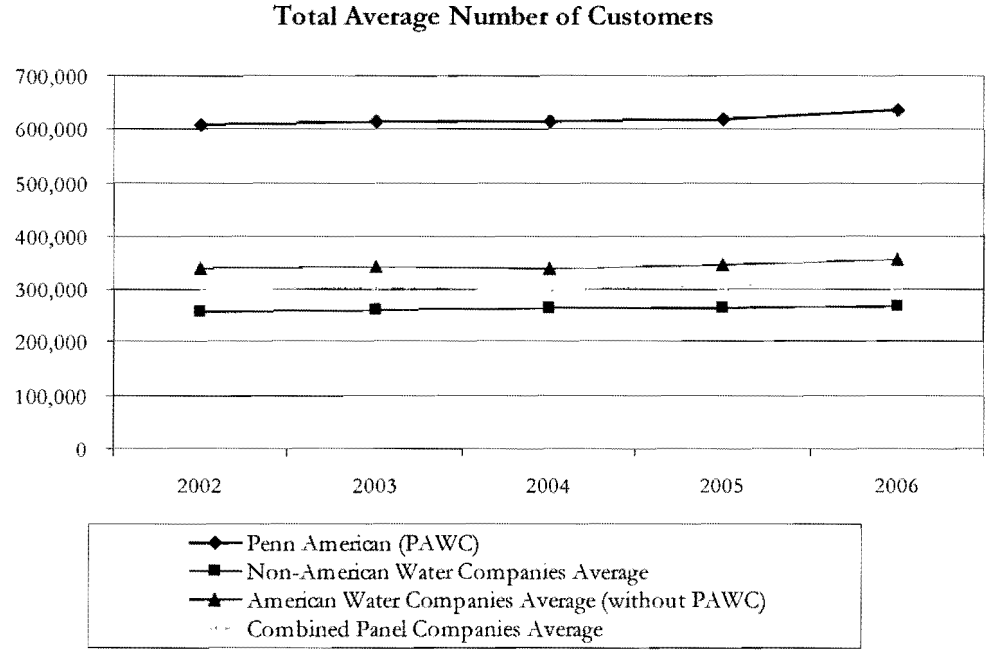


Total Average Number of Customers (year-end)

Exhibit XIV-43
Total Average Number of Customers (year-end)

Total Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**609,110**	**615,069**	**614,308**	**618,340**	**637,660**	**2.33%**
Aqua Penn/Philladelphia Suburban	387,634	390,019	395,935	399,456	403,860	1.03%
Aquarion Connecticut	172,328	174,033	176,101	177,911	179,004	0.95%
San Jose Water Corp	219,041	219,670	220,370	223,198	223,184	0.47%
Non-American Water Companies Average	**259,668**	**261,241**	**264,135**	**266,855**	**268,683**	**0.86%**
Elizabethtown Water*	203,138	204,735	206,559	207,690	208,211	0.62%
Missouri American**	432,029	444,557	450,547	459,564	464,365	1.82%
New Jersey American*	378,957	383,222	360,601	368,181	395,561	1.08%
American Water Companies Average (without PAWC)	**338,041**	**344,171**	**339,236**	**345,145**	**356,046**	**1.31%**
Combined Panel Companies Average	**298,855**	**302,706**	**301,686**	**306,000**	**312,364**	**1.11%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

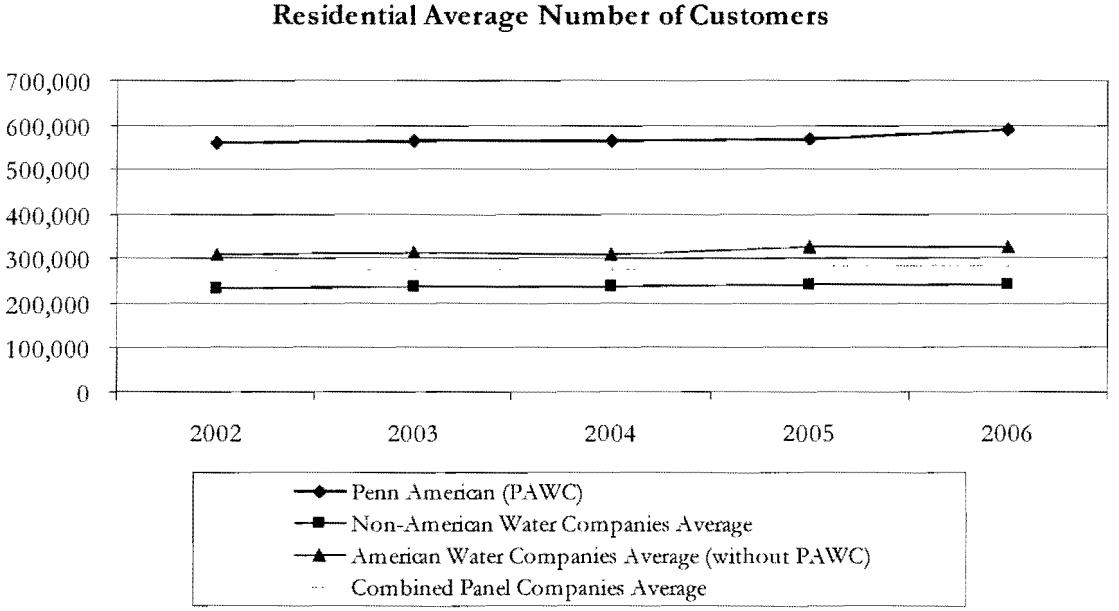


Residential Average Number of Customers

Exhibit XIV-44
Residential Average Number of Customer

Residential Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**559,570**	**565,301**	**565,290**	**569,432**	**588,133**	**1.25%**
Aqua Penn/Philladelphia Suburban	353,321	358,333	364,010	367,851	371,959	1.29%
Aquarion Connecticut	155,765	157,359	158,765	160,522	162,026	0.99%
San Jose Water Corp	193,975	193,540	195,307	195,749	196,510	0.33%
Non-American Water Companies Average	**234,354**	**236,411**	**239,361**	**241,374**	**243,498**	**0.96%**
Elizabethtown Water*	200,084	191,167	192,686	203,988	192,044	-1.02%
Missouri American**	397,238	409,840	412,983	418,977	424,185	1.65%
New Jersey American*	337,551	342,412	323,635	361,768	359,346	1.58%
American Water Companies Average (without PAWC)	**311,624**	**314,473**	**309,768**	**328,244**	**325,192**	**1.07%**
Combined Panel Companies Average	**272,989**	**275,442**	**274,564**	**284,809**	**284,345**	**1.02%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



Commercial Average Number of Customers

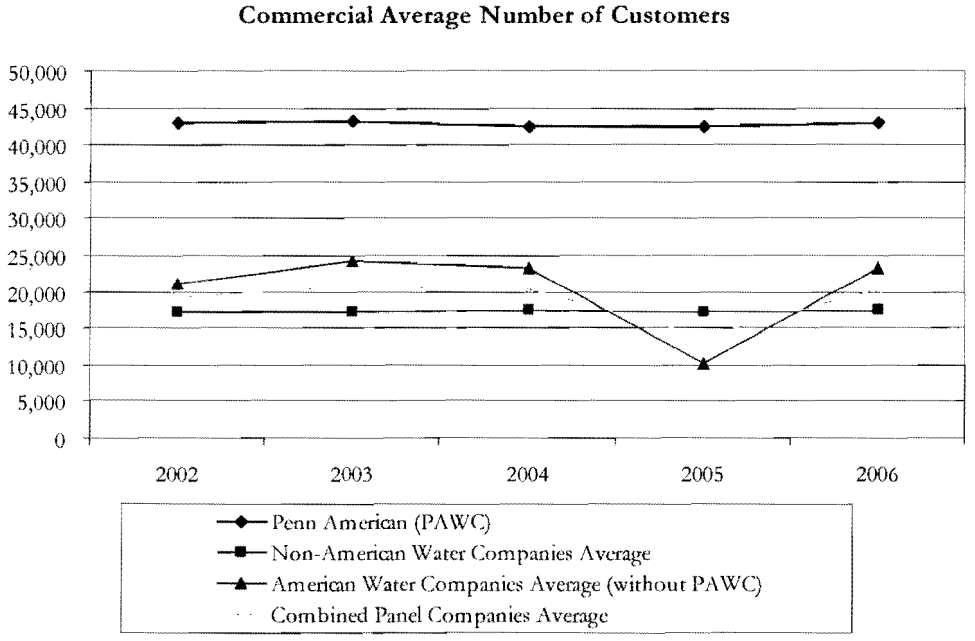
Exhibit XIV-45
Commercial Average Number of Customers

Commercial Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**43,040**	**43,229**	**42,560**	**42,475**	**42,996**	**-0.03%**
Aqua Penn/Philladelphia Suburban	19,655	19,962	20,065	20,078	20,210	0.70%
Aquarion Connecticut	11,770	11,820	12,208	12,210	11,907	0.29%
San Jose Water Corp	20,123	20,246	19,902	19,544	20,210	0.11%
Non-American Water Companies Average	**17,183**	**17,343**	**17,392**	**17,277**	**17,442**	**0.38%**
Elizabethtown Water**	0	10,208	10,330	0	10,561	1.13%
Missouri American***	28,799	28,668	29,587	30,902	30,216	1.21%
New Jersey American*	34,731	33,972	30,149	0	29,396	-4.08%
American Water Companies Average (without PAWC)	**21,177**	**24,283**	**23,355**	**10,301**	**23,391**	**2.52%**
Combined Panel Companies Average	**19,180**	**20,813**	**20,374**	**13,789**	**20,417**	**1.57%**

* 2006 New Jersey American and PAWC data from Data Request 620 response, not NAWC

** 2006 Elizabethtown Water data from Data Request 620 response, not NAWC and Compound Growth/Loss calculated only on 2003-2006

*** 2002 data from filed MO PSC Annual Report, not NAWC



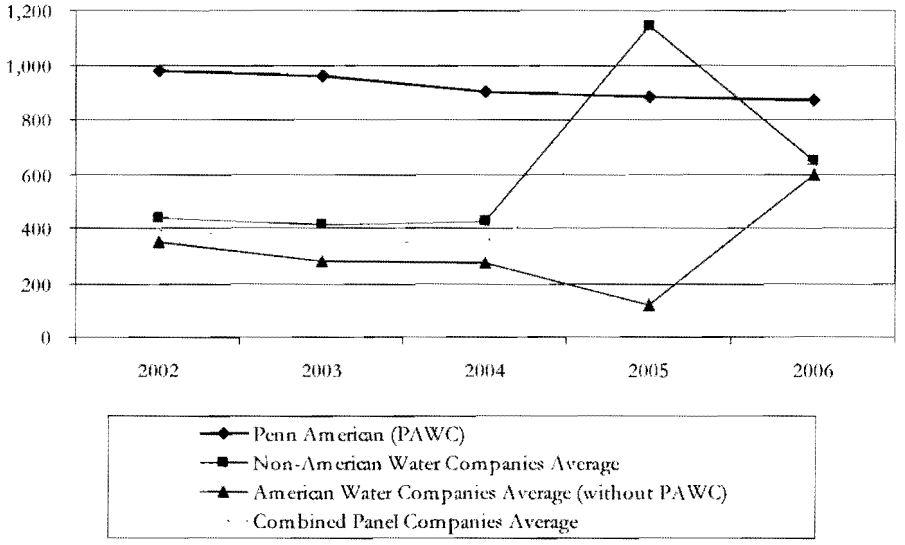
Industrial Average Number of Customers

Exhibit XIV-46
Industrial Average Number of Customers

Industrial Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**976**	**959**	**899**	**883**	**873**	**-2.75%**
Aqua Penn/Philladelphia Suburban	923	917	903	894	886	-1.02%
Aquarion Connecticut	296	237	279	810	225	-6.63%
San Jose Water Corp	95	91	90	1,722	835	72.18%
Non-American Water Companies Average	**438**	**415**	**424**	**1,142**	**649**	**10.32%**
Elizabethtown Water*	9	8	8	0	1,049	228.57%
Missouri American**	608	419	412	365	355	-12.59%
New Jersey American*	426	418	402	0	388	-2.31%
American Water Companies Average (without PAWC)	**348**	**282**	**274**	**122**	**597**	**14.49%**
Combined Panel Companies Average	**393**	**348**	**349**	**632**	**623**	**12.22%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Industrial Average Number of Customers



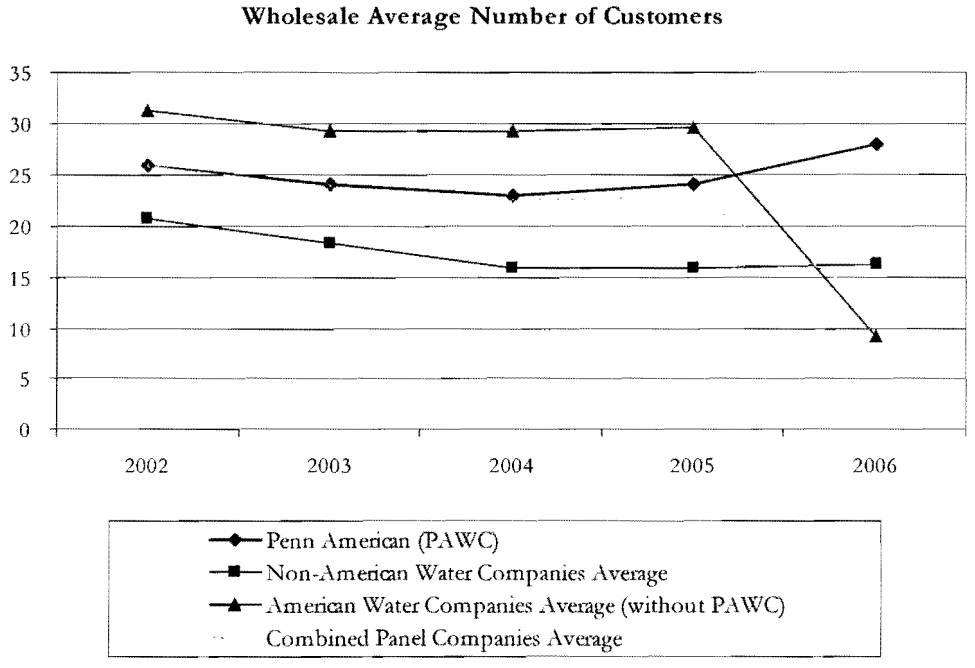
PAWC experienced a slight decrease over the 2002-2006 time period, as it reclassified certain industrial customers to the commercial bill class as defined by its tariff. Furthermore, data anomalies seemed to occur for other companies in 2005 and 2006.

Wholesale Average Number of Customers

Exhibit XIV-47
Wholesale Average Number of Customers

Wholesale Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**26**	**24**	**23**	**24**	**28**	**1.87%**
Aqua Penn/Philladelphia Suburban	15	12	12	12	13	-3.51%
Aquarion Connecticut	8	8	1	1	1	-40.54%
San Jose Water Corp	39	35	35	35	35	-2.67%
Non-American Water Companies Average	**21**	**18**	**16**	**16**	**16**	**-5.71%**
Elizabethtown Water*	13	13	15	16	0	-100.00%
Missouri American**	42	33	31	29	28	-9.64%
New Jersey American*	39	42	42	44	0	-100.00%
American Water Companies Average (without PAWC)	**31**	**29**	**29**	**30**	**9**	**-26.12%**
Combined Panel Companies Average	**26**	**24**	**23**	**23**	**13**	**-16.18%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



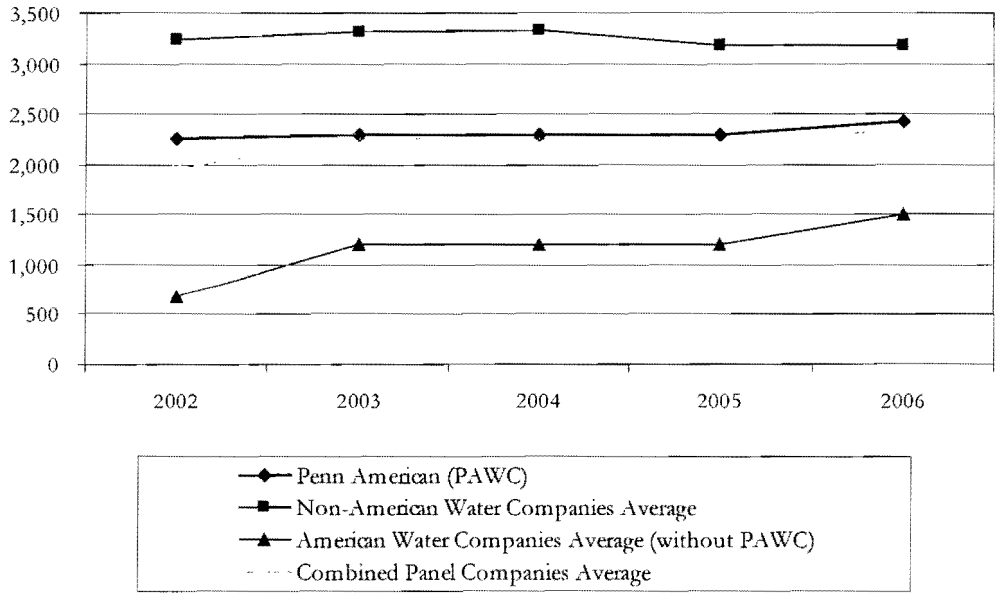
Governmental Authority Average Number of Customers

Exhibit XIV-48
Governmental Authority Average Number of Customers

Governmental Authority Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**2,258**	**2,294**	**2,301**	**2,298**	**2,421**	**1.76%**
Aqua Penn/Philladelphia Suburban	6,711	6,751	6,750	6,272	6,280	-1.65%
Aquarion Connecticut	1,366	1,495	1,538	1,554	1,542	3.08%
San Jose Water Corp	1,658	1,681	1,700	1,720	1,720	0.92%
Non-American Water Companies Average	**3,245**	**3,309**	**3,329**	**3,182**	**3,181**	**-0.50%**
Elizabethtown Water*	0	0	0	0	790	N/A
Missouri American**	0	1,544	1,572	1,615	1,652	2.26%
New Jersey American*	2,025	2,079	2,042	2,008	2,086	0.74%
American Water Companies Average (without PAWC)	**675**	**1,208**	**1,205**	**1,208**	**1,509**	**22.28%**
Combined Panel Companies Average	**1,960**	**2,258**	**2,267**	**2,195**	**2,345**	**4.59%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC and Compound Growth/Loss calculation 2003-2006 only

Governmental Authority Average Number of Customers



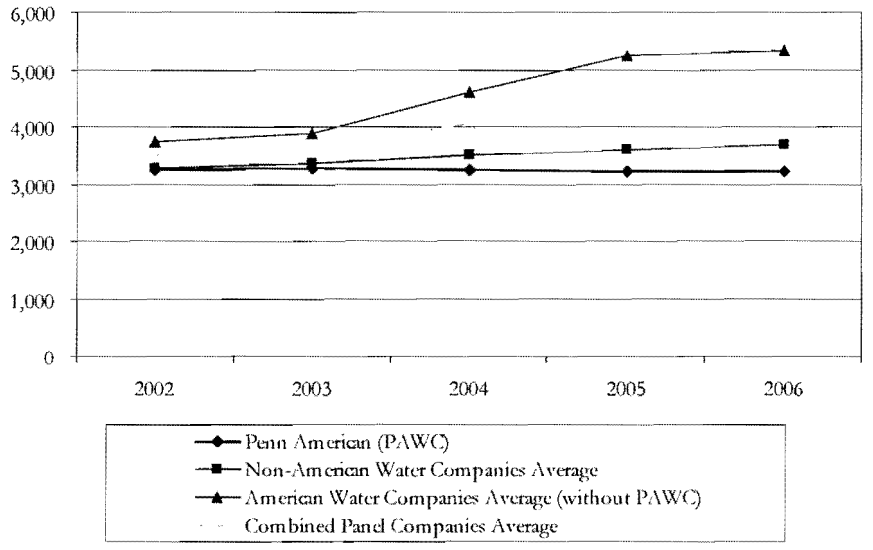
Fire Service Average Number of Customers

Exhibit XIV-49
Fire Service Average Number of Customers

Fire Service Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**3,240**	**3,262**	**3,235**	**3,223**	**3,209**	**-0.24%**
Aqua Penn/Philladelphia Suburban	3,864	4,044	4,195	4,349	4,512	3.95%
Aquarion Connecticut	3,123	3,114	3,310	3,354	3,303	1.41%
San Jose Water Corp	2,851	2,945	3,028	3,083	3,195	2.89%
Non-American Water Companies Average	**3,279**	**3,368**	**3,511**	**3,595**	**3,670**	**2.85%**
Elizabethtown Water*	3,032	3,339	3,520	3,686	3,738	5.37%
Missouri American**	4,022	4,053	5,962	7,670	7,923	18.47%
New Jersey American*	4,185	4,299	4,331	4,361	4,345	0.94%
American Water Companies Average (without PAWC)	**3,746**	**3,897**	**4,604**	**5,239**	**5,335**	**9.24%**
Combined Panel Companies Average	**3,513**	**3,632**	**4,058**	**4,417**	**4,503**	**6.40%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Fire Service Average Number of Customers



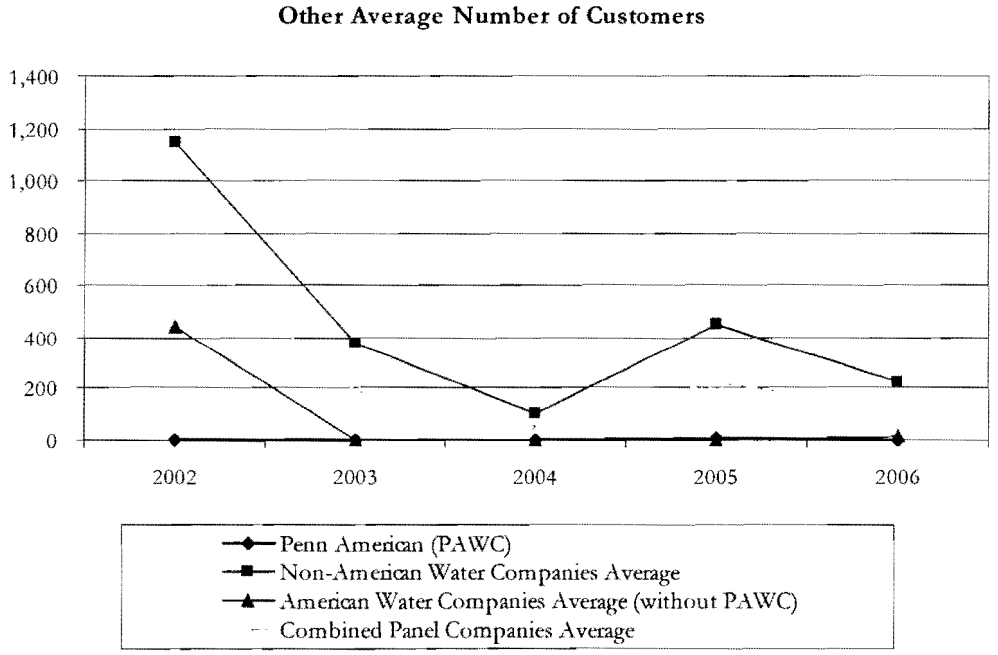
PAWC experienced a slight decrease over the 2002-2006 time period. Company management indicates that due to PaPUC regulations on metering all customers, PAWC no longer adds private fire-service customers, unless through acquisition of other system. Instead, all such new customers are set up as general water service customers.

Other Average Number of Customers

Exhibit XIV-50
Other Average Number of Customers

Other Average Number of Customers	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**0**	**0**	**0**	**5**	**0**	**0.00%**
Aqua Penn/Philladelphia Suburban	3,145	0	0	0	0	-100.00%
Aquarion Connecticut	0	0	0	0	0	0.00%
San Jose Water Corp	300	1,131	308	1,345	679	22.66%
Non-American Water Companies Average	**1,148**	**377**	**103**	**448**	**226**	**-33.37%**
Elizabethtown Water*	0	0	0	0	29	N/A
Missouri American**	1,321	0	0	6	6	-74.04%
New Jersey American*	0	0	0	0	0	0.00%
American Water Companies Average (without PAWC)	**440**	**0**	**0**	**2**	**12**	**-59.65%**
Combined Panel Companies Average	**794**	**189**	**51**	**225**	**119**	**-37.79%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



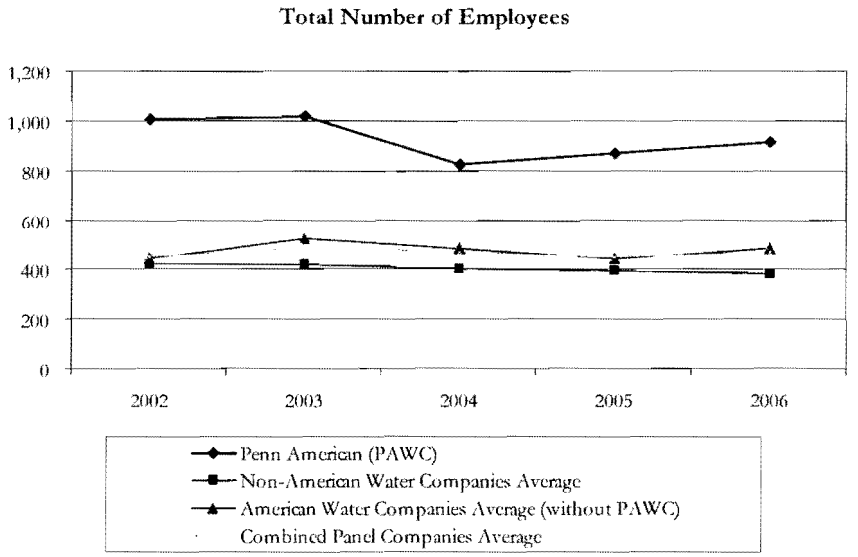
Total Employees (year-end)

The counts in *Exhibit XIV-51* represent end-of-year totals and include active, full-time and part-time employees.

Exhibit XIV-51
Total Number of Employees (year-end)

Total Number of Employees	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**1,004**	**1,018**	**824**	**868**	**917**	**-2.24%**
Aqua Penn/Philladelphia Suburban	621	628	583	596	541	-3.39%
Aquarion Connecticut	340	328	310	270	269	-5.69%
San Jose Water Corp	296	301	302	309	323	2.21%
Non-American Water Companies Average	**419**	**419**	**398**	**392**	**378**	**-2.56%**
Elizabethtown Water*	426	447	433	312	312	-7.49%
Missouri American**	N/A	661	563	559	672	0.55%
New Jersey American	459	462	459	459	459	0.00%
American Water Companies Average (without PAWC)	**443**	**523**	**485**	**443**	**481**	**2.11%**
Combined Panel Companies Average	**451**	**493**	**472**	**451**	**470**	**1.05%**

* 2006 Elizabethtown Water and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC and Compound Growth/Loss calculated 2003-2006 only



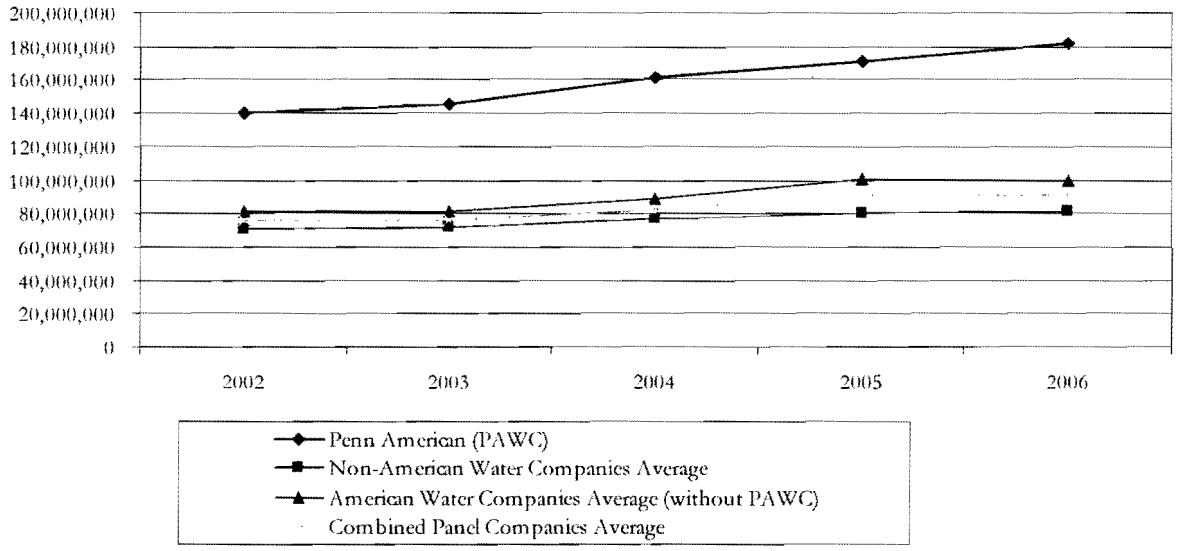
Total Operation and Maintenance Expense

Exhibit XIV-52
Total Operation & Maintenance Expense

Total Operation & Maintenance Expense	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**140,399,362**	**144,940,208**	**161,227,615**	**171,439,753**	**181,475,588**	**6.63%**
Aqua Penn/Philladelphia Suburban	76,444,185	78,802,313	81,983,126	88,721,951	94,599,605	5.47%
Aquarion Connecticut	39,197,702	41,298,518	45,163,941	42,857,314	40,552,926	0.85%
San Jose Water Corp	94,986,979	93,656,685	104,481,178	108,024,555	110,200,296	3.78%
Non-American Water Companies Average	**70,209,622**	**71,252,505**	**77,209,415**	**79,867,940**	**81,784,276**	**3.89%**
Elizabethtown Water*	60,925,576	63,998,543	64,554,515	72,378,041	71,082,952	3.93%
Missouri American**	75,338,685	73,898,153	77,902,552	95,624,673	92,203,987	5.18%
New Jersey American*	108,697,766	105,424,935	122,708,800	134,917,990	136,089,126	5.78%
American Water Companies Average (without PAWC)	**81,654,009**	**81,107,210**	**88,388,622**	**100,973,568**	**99,792,022**	**5.14%**
Combined Panel Companies Average	**75,931,816**	**76,179,858**	**82,799,019**	**90,420,754**	**90,788,149**	**4.57%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Total Operation & Maintenance Expense



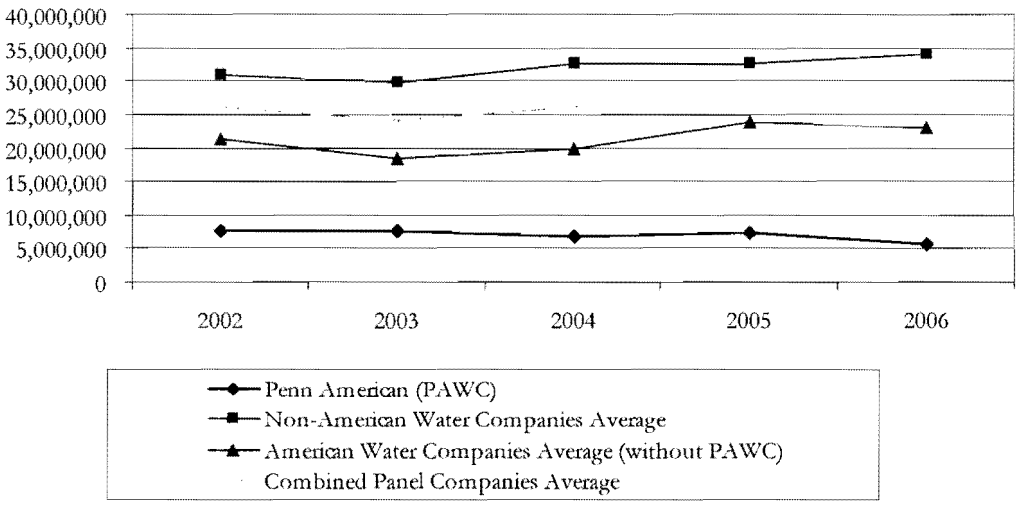
Production Expense

Exhibit XIV-53
Production Expense

Production Expense	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**7,752,285**	**7,689,097**	**6,793,175**	**7,381,507**	**5,773,244**	**-7.10%**
Aqua Penn/Philladelphia Suburban	18,090,069	19,055,475	18,648,604	19,977,447	21,435,660	4.33%
Aquarion Connecticut	7,349,785	7,243,250	6,938,601	7,539,411	8,144,443	2.60%
San Jose Water Corp	67,061,678	62,995,814	71,925,820	70,548,730	72,843,100	2.09%
Non-American Water Companies Average	**30,833,844**	**29,764,846**	**32,504,342**	**32,688,529**	**34,141,068**	**2.58%**
Elizabethtown Water*	21,118,571	21,248,814	20,432,119	26,273,229	22,742,952	1.87%
Missouri American**	12,838,387	11,625,043	11,604,195	11,955,595	12,521,618	-0.62%
New Jersey American*	30,185,549	22,806,944	27,297,169	33,239,420	33,488,396	2.63%
American Water Companies Average (without PAWC)	**21,380,836**	**18,560,267**	**19,777,828**	**23,822,748**	**22,917,655**	**1.75%**
Combined Panel Companies Average	**26,107,340**	**24,162,557**	**26,141,085**	**28,255,639**	**28,529,362**	**2.24%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Production Expense



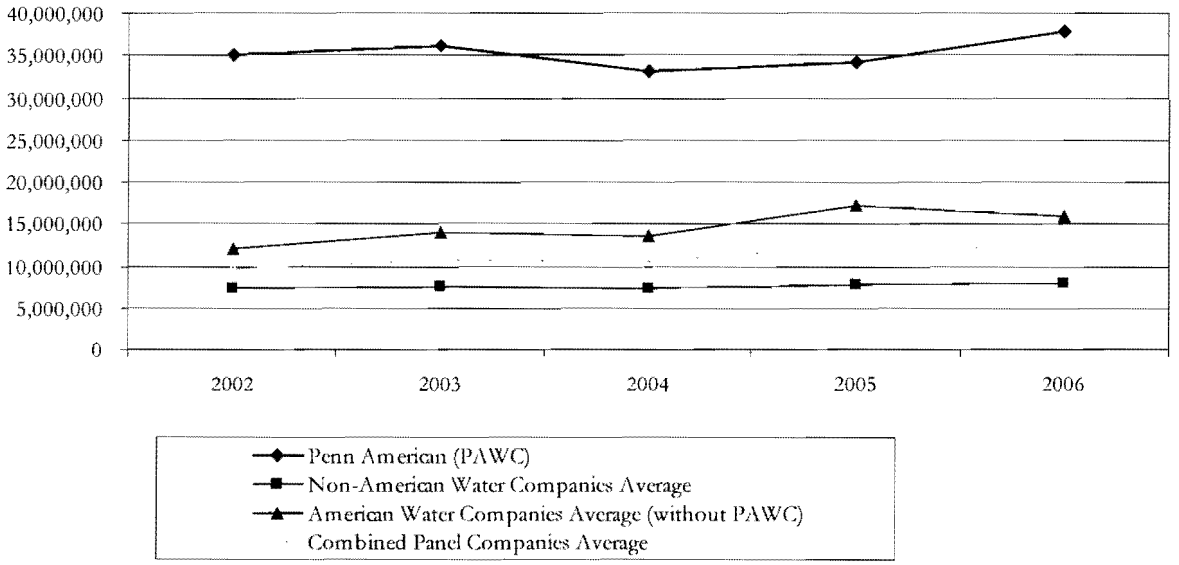
Purification Expense

Exhibit XIV-54
Purification Expense

Purification Expense	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**35,073,349**	**36,209,603**	**33,221,018**	**34,241,715**	**37,841,759**	**1.92%**
Aqua Penn/Philladelphia Suburban	12,908,807	12,927,372	13,020,736	13,775,246	13,975,013	2.00%
Aquarion Connecticut	7,203,038	8,176,316	7,306,861	7,386,838	7,342,871	0.48%
San Jose Water Corp	1,921,049	1,761,467	1,671,824	2,355,766	2,415,556	5.89%
Non-American Water Companies Average	**7,344,298**	**7,621,718**	**7,333,140**	**7,839,283**	**7,911,147**	**1.88%**
Elizabethtown Water*	5,890,628	5,846,758	5,345,246	7,165,426	8,016,372	8.01%
Missouri American**	10,369,057	10,152,043	10,127,146	11,092,540	11,638,949	2.93%
New Jersey American*	19,955,422	25,965,693	25,219,373	33,159,606	28,274,918	9.10%
American Water Companies Average (without PAWC)	**12,071,702**	**13,988,165**	**13,563,922**	**17,139,191**	**15,976,746**	**7.26%**
Combined Panel Companies Average	**9,708,000**	**10,804,942**	**10,448,531**	**12,489,237**	**11,943,947**	**5.32%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Purification Expense

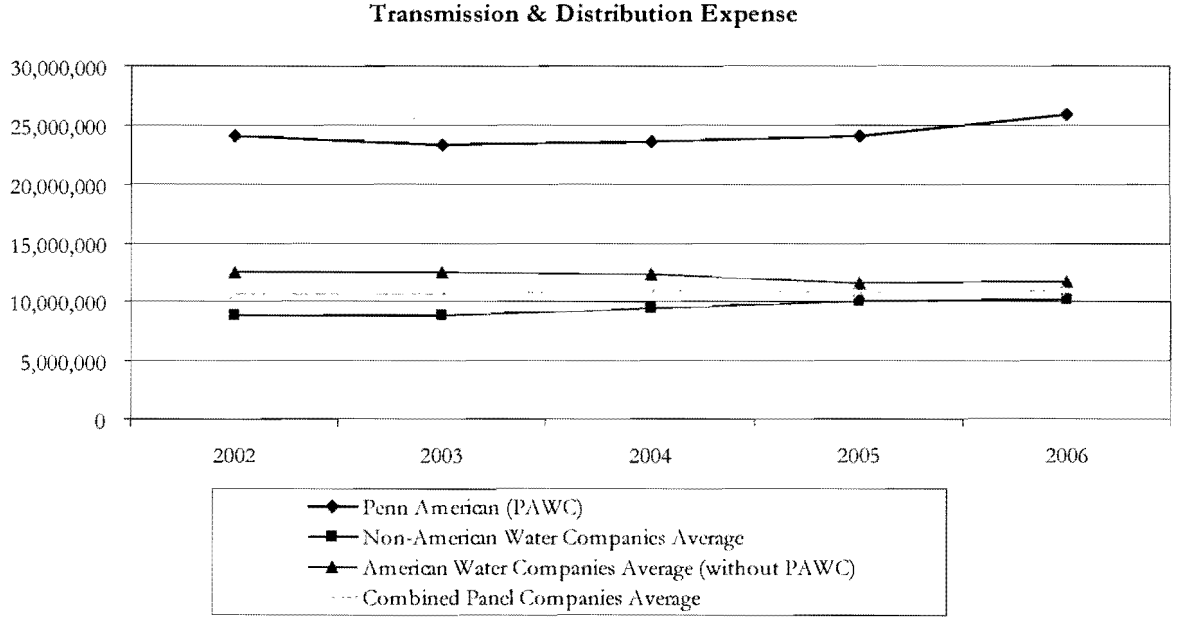


Transmission and Distribution Expense

Exhibit XIV-55
Transmission & Distribution Expense

Transmission & Distribution Expense	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**24,055,511**	**23,267,164**	**23,573,589**	**24,014,129**	**25,866,804**	**1.83%**
Aqua Penn/Philladelphia Suburban	9,829,785	9,670,519	11,255,043	11,597,366	11,626,718	4.29%
Aquarion Connecticut	7,240,265	7,168,826	6,738,015	7,137,160	7,159,026	-0.28%
San Jose Water Corp	9,404,358	9,507,480	10,408,940	11,191,914	11,628,936	5.45%
Non-American Water Companies Average	**8,824,803**	**8,782,275**	**9,467,333**	**9,975,480**	**10,138,227**	**3.53%**
Elizabethtown Water*	9,186,598	9,798,022	11,184,265	8,757,742	6,673,220	-7.68%
Missouri American**	15,044,078	14,514,333	12,640,611	13,949,457	15,397,097	0.58%
New Jersey American*	13,354,845	13,320,888	13,315,399	11,908,808	13,120,148	-0.44%
American Water Companies Average (without PAWC)	**12,528,507**	**12,544,414**	**12,380,092**	**11,538,669**	**11,730,155**	**-1.63%**
Combined Panel Companies Average	**10,676,655**	**10,663,345**	**10,923,712**	**10,757,075**	**10,934,191**	**0.60%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

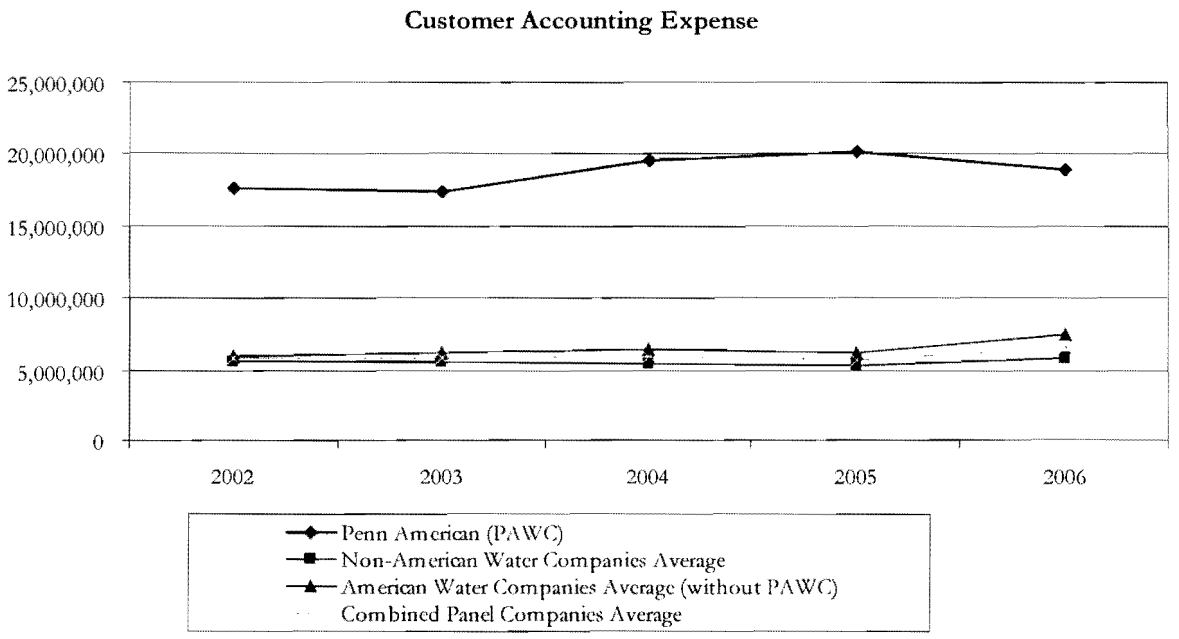


Customer Accounting Expense

Exhibit XIV-56
Customer Accounting Expense

Customer Accounting Expense	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**17,675,097**	**17,382,430**	**19,517,836**	**20,119,161**	**18,892,361**	**1.68%**
Aqua Penn/Philladelphia Suburban	8,944,622	8,472,758	7,940,738	7,274,091	8,504,329	-1.25%
Aquarion Connecticut	3,760,960	3,713,819	3,910,816	3,781,851	4,099,160	2.18%
San Jose Water Corp	4,186,325	4,403,424	4,589,995	4,823,892	4,819,801	3.59%
Non-American Water Companies Average	**5,630,636**	**5,530,000**	**5,480,516**	**5,293,278**	**5,807,763**	**0.78%**
Elizabethtown Water*	5,128,178	7,147,074	5,790,879	2,677,987	6,081,439	4.35%
Missouri American**	4,906,868	4,942,797	5,689,269	5,910,226	7,116,140	9.74%
New Jersey American*	7,870,638	6,701,074	7,958,610	9,959,593	9,197,571	3.97%
American Water Companies Average (without PAWC)	**5,968,561**	**6,263,648**	**6,479,586**	**6,182,602**	**7,465,050**	**5.75%**
Combined Panel Companies Average	**5,799,599**	**5,896,824**	**5,980,051**	**5,737,940**	**6,636,407**	**3.43%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC



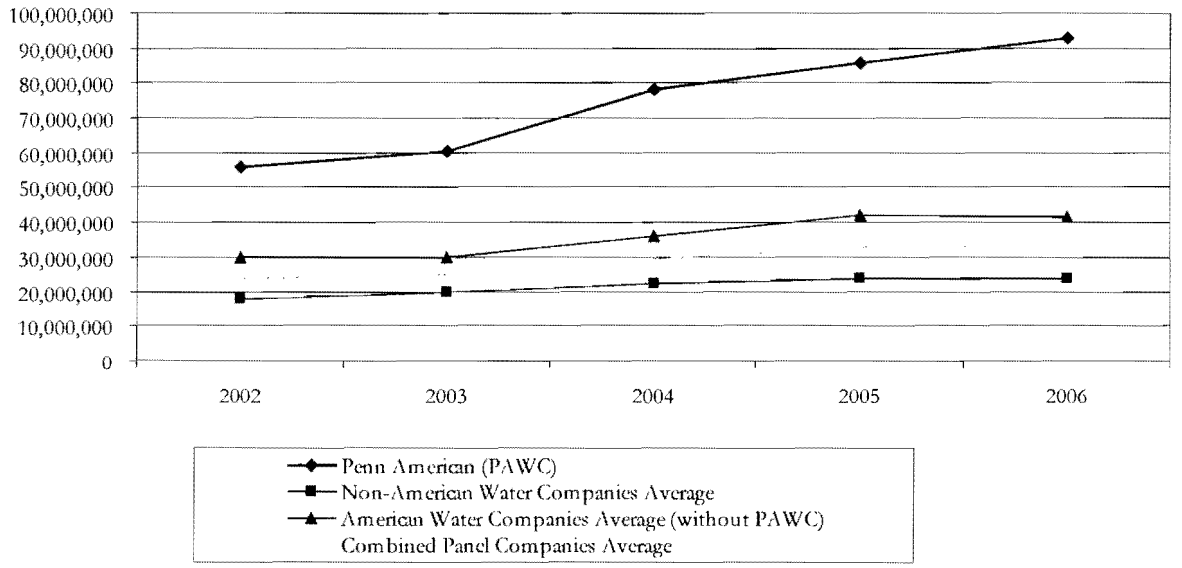
Administrative and General Expense

Exhibit XIV-57
Administrative & General Expense

Administrative & General Expense	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**55,843,120**	**60,391,914**	**78,121,997**	**85,683,241**	**93,101,420**	**13.63%**
Aqua Penn/Philladelphia Suburban	26,670,902	28,676,189	31,118,005	36,097,801	39,057,885	10.01%
Aquarion Connecticut	13,643,654	14,996,107	20,269,648	17,012,054	13,807,426	0.30%
San Jose Water Corp	12,413,569	14,988,500	15,881,599	19,104,253	18,492,903	10.48%
Non-American Water Companies Average	**17,576,042**	**19,553,599**	**22,423,084**	**24,071,369**	**23,786,071**	**7.86%**
Elizabethtown Water*	19,601,601	19,957,875	21,802,006	27,503,657	27,568,969	8.90%
Missouri American**	32,180,295	32,663,681	37,841,331	52,716,855	45,530,183	9.06%
New Jersey American*	37,331,312	36,630,336	48,918,249	46,650,563	52,008,093	8.64%
American Water Companies Average (without PAWC)	**29,704,403**	**29,750,631**	**36,187,195**	**42,290,358**	**41,702,415**	**8.85%**
Combined Panel Companies Average	**23,640,222**	**24,652,115**	**29,305,140**	**33,180,864**	**32,744,243**	**8.49%**

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Administrative & General Expense



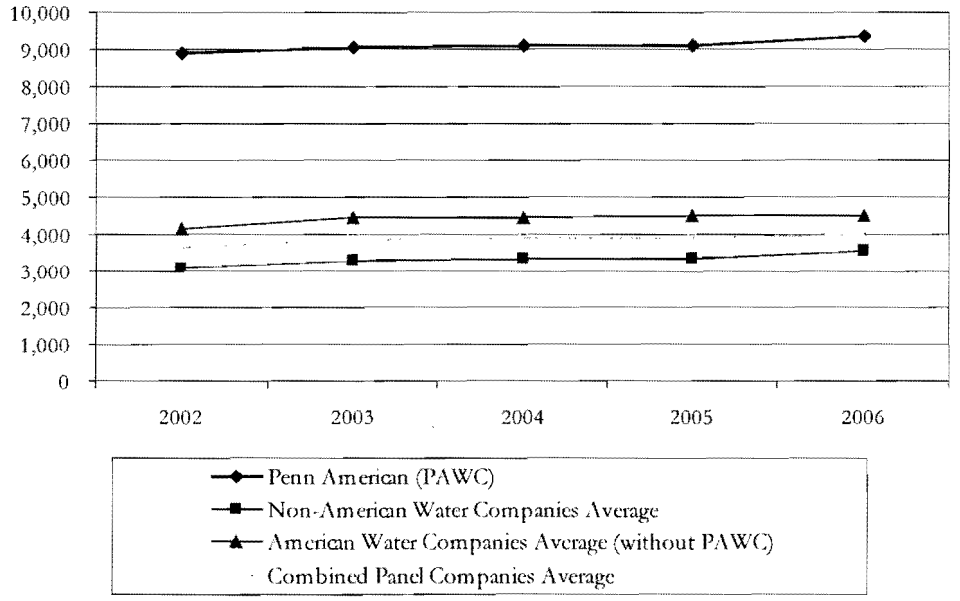
Miles of Main in Service

Exhibit XIV-58
Miles of Main in Service

Miles of Main in Service	2002	2003	2004	2005	2006	Compound Growth/Loss 2002-2006
Penn American (PAWC)*	**8,891**	**9,037**	**9,108**	**9,108**	**9,370**	**1.32%**
Aqua Penn/Philladelphia Suburban	4,173	4,754	4,784	4,784	5,100	5.14%
Aquarion Connecticut*	2,724	2,687	2,773	2,786	2,799	0.68%
San Jose Water Corp	2,422	2,430	2,434	2,447	2,739	3.12%
Non-American Water Companies Average	**3,106**	**3,290**	**3,330**	**3,339**	**3,546**	**3.36%**
Elizabethtown Water*	2,905	2,924	2,924	2,936	2,974	0.59%
Missouri American**	4,840	5,616	5,610	5,610	5,545	3.46%
New Jersey American	4,760	4,833	4,865	4,898	4,926	0.86%
American Water Companies Average (without PAWC)	**4,168**	**4,458**	**4,466**	**4,481**	**4,482**	**1.83%**
Combined Panel Companies Average	**3,637**	**3,874**	**3,898**	**3,910**	**4,014**	**2.49%**

* 2006 Elizabethtown Water and PAWC data from Data Request 620 response, not NAWC
** 2002 data from filed MO PSC Annual Report, not NAWC

Total Miles of Main in Service



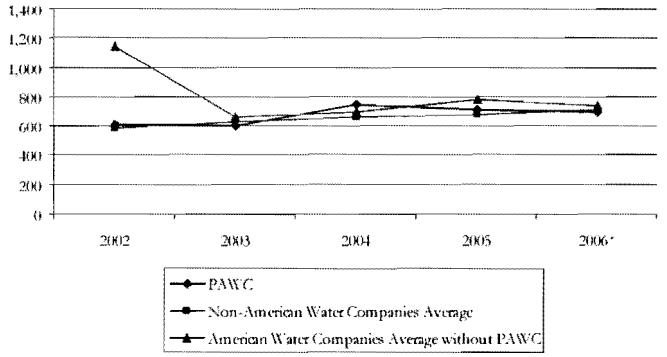
Performance Ratio Expense

Exhibit XIV-59
Performance Ratio Expense Background Data
Total Average Number of Customers per Employee
Gross Utility Plant in Service per Total Average Number of Customers

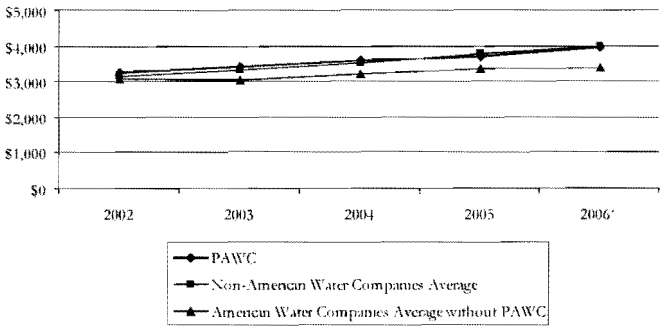
Performance Ratios	2002	2003	2004	2005	2006*	Compound Growth/Loss 2002-2006
Production Expense (PAWC)	7,752,285	7,689,097	6,793,175	7,381,507	5,773,244	-7.10%
Production Expense (Non-American Water Companies Average)	30,833,844	29,764,846	32,504,342	32,688,529	34,141,068	2.58%
Production Expense (American Water Companies Average without PAWC)	21,380,836	18,560,267	19,777,828	23,822,748	22,917,655	1.75%
Purification Expense (PAWC)	35,073,349	36,209,603	33,221,018	34,241,715	37,841,759	1.92%
Purification Expense (Non-American Water Companies Average)	7,344,298	7,621,718	7,333,140	7,839,283	7,911,147	1.88%
Purification Expense (American Water Companies Average without PAWC)	12,071,702	13,988,165	13,563,922	17,139,191	15,976,746	7.26%
Transmission & Distribution Expense (PAWC)	24,055,511	23,267,164	23,573,589	24,014,129	25,866,804	1.83%
Transmission & Distribution Expense (Non-American Water Companies Average)	8,821,803	8,782,275	9,467,333	9,975,480	10,138,227	3.53%
Transmission & Distribution Expense (American Water Companies Average without PAWC)	12,528,507	12,544,414	12,380,082	11,538,669	11,730,155	-1.63%
Customer Accounting Expense (PAWC)	17,675,097	17,382,430	19,517,836	20,119,161	18,892,361	1.68%
Customer Accounting Expense (Non-American Water Companies Average)	5,630,636	5,530,000	5,480,516	5,293,278	5,807,763	0.78%
Customer Accounting Expense (American Water Companies Average without PAWC)	5,968,561	6,263,648	6,179,586	6,182,602	7,465,050	5.75%
Administrative & General Expense (PAWC)	55,843,120	60,391,914	78,121,997	85,683,241	93,101,420	13.63%
Administrative & General Expense (Non-American Water Companies Average)	17,576,042	19,553,599	22,423,084	24,071,369	23,786,071	7.86%
Administrative & General Expense (American Water Companies Average without PAWC)	29,701,103	29,750,631	36,187,195	42,290,358	41,702,415	8.85%
Total Operation & Maintenance Expense (PAWC)	140,399,362	144,940,208	161,227,615	171,439,753	181,475,588	6.63%
Total Operation & Maintenance Expense (Non-American Water Companies Average)	70,209,622	71,252,505	77,209,415	79,867,940	81,784,276	3.89%
Total Operation & Maintenance Expense (American Water Companies Average without PAWC)	81,654,009	81,107,240	88,388,622	100,973,568	99,792,022	5.14%
Total Average Number of Customers per Employee (PAWC)	607	604	746	712	695	3.47%
Total Average Number of Customers per Employee (Non-American Water Companies Average)	586	623	664	681	711	4.94%
Total Average Number of Customers per Employee (American Water Companies Average without PAWC)	1,146	658	699	779	740	-10.35%
Gross Utility Plant in Service per Total Average Number of Customers (PAWC)	$3,235	$3,429	$3,584	$3,722	$3,942	5.07%
Gross Utility Plant in Service per Total Average Number of Customers (Non-American Water Companies Average)	$3,138	$3,336	$3,536	$3,759	$3,999	6.25%
Gross Utility Plant in Service per Total Average Number of Customers (American Water Companies Average without PAWC)	$3,087	$3,051	$3,217	$3,358	$3,406	2.49%

* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC

Total Average Number of Customers per Employee



Gross Utility Plant in Service per Total Average Number of Customers



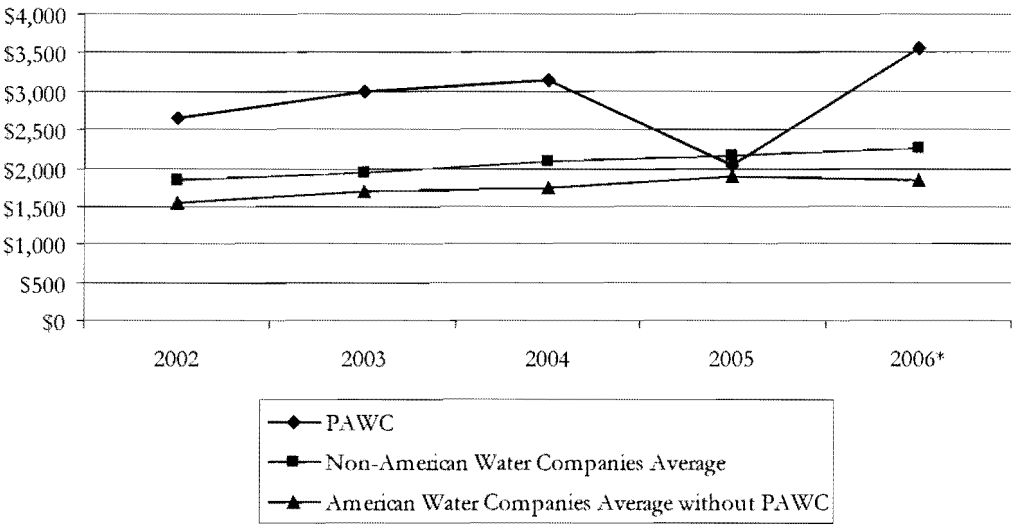
Operation and Maintenance Expenses per Million Gallons

Exhibit XIV-60
Expenses per Million Gallons

Performance Ratios	2002	2003	2004	2005	2006*	Compound Growth/Loss 2002-2006
Production Expenses per Million Gallons (PAWC)	$146	$158	$133	$88	$113	-6.27%
Production Expenses per Million Gallons (Non-American Water Companies Average)	$804	$814	$878	$880	$942	4.03%
Production Expenses per Million Gallons (American Water Companies Average without PAWC)	$408	$390	$392	$447	$424	0.95%
Purification Expenses per Million Gallons (PAWC)	$662	$746	$648	$409	$740	2.83%
Purification Expenses per Million Gallons (Non-American Water Companies Average)	$192	$209	$198	$211	$218	3.31%
Purification Expenses per Million Gallons (American Water Companies Average without PAWC)	$230	$294	$269	$321	$295	6.42%
Transmission & Distribution Expenses per Million Gallons (PAWC)	$454	$479	$460	$287	$506	2.74%
Transmission & Distribution Expenses per Million Gallons (Non-American Water Companies Average)	$230	$240	$256	$269	$280	4.99%
Transmission & Distribution Expenses per Million Gallons (American Water Companies Average without PAWC)	$239	$264	$245	$216	$217	-2.40%
Customer Accounting Expenses per Million Gallons (PAWC)	$334	$358	$381	$240	$370	2.59%
Customer Accounting Expenses per Million Gallons (Non-American Water Companies Average)	$147	$151	$148	$143	$160	2.20%
Customer Accounting Expenses per Million Gallons (American Water Companies Average without PAWC)	$114	$132	$122	$116	$138	4.93%
Administrative & General Expenses per Million Gallons (PAWC)	$1,054	$1,244	$1,524	$1,023	$1,822	14.65%
Administrative & General Expenses per Million Gallons (Non-American Water Companies Average)	$458	$535	$605	$648	$656	9.38%
Administrative & General Expenses per Million Gallons (American Water Companies Average without PAWC)	$567	$626	$717	$793	$771	8.00%
Total Operation & Maintenance Expenses per Million Gallons (PAWC)	$2,651	$2,987	$3,145	$2,048	$3,551	7.58%
Total Operation & Maintenance Expenses per Million Gallons (Non-American Water Companies Average)	$1,831	$1,949	$2,084	$2,151	$2,256	5.35%
Total Operation & Maintenance Expenses per Million Gallons (American Water Companies Average without PAWC)	$1,558	$1,706	$1,752	$1,893	$1,845	4.32%

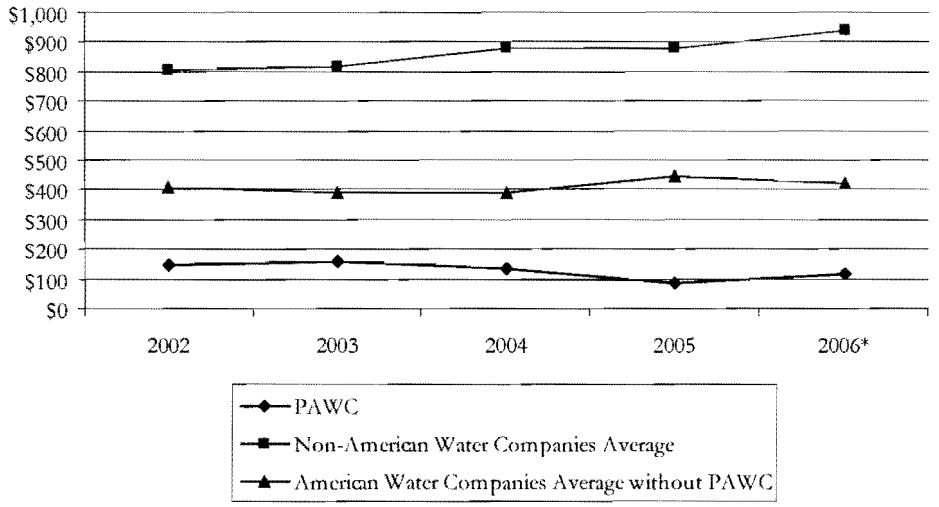
* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC

Total Operation & Maintenance Expenses per Million Gallons



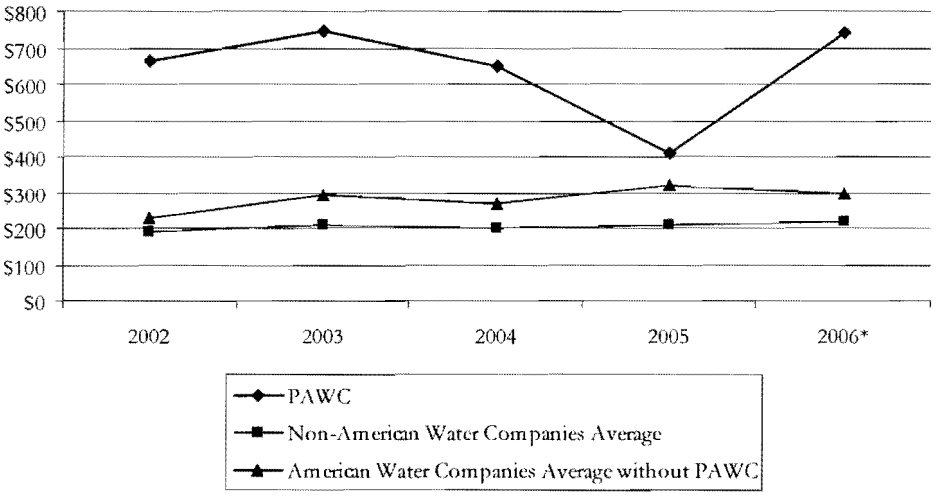
Production Expenses per Million Gallons

Exhibit XIV-61
Production Expenses per Million Gallons



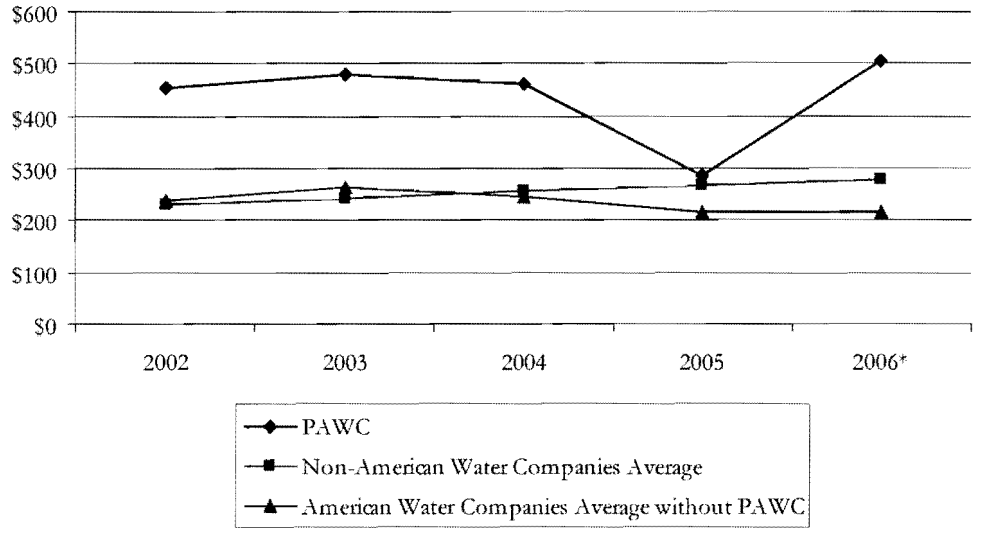
Purification Expenses per Million Gallons

Exhibit XIV-62
Purification Expenses per Million Gallons



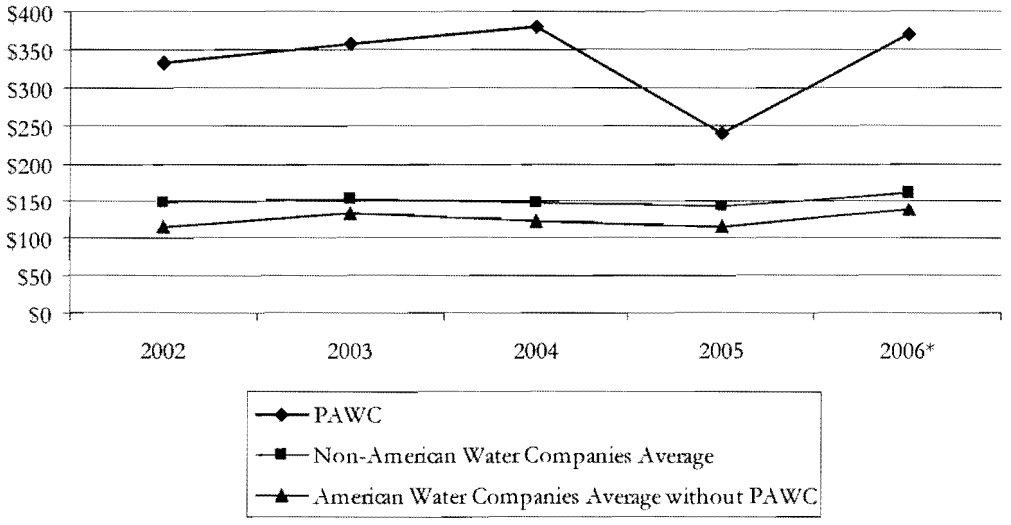
Transmission & Distribution Expenses per Million Gallons

Exhibit XIV-63
Transmission & Distribution Expenses per Million Gallons



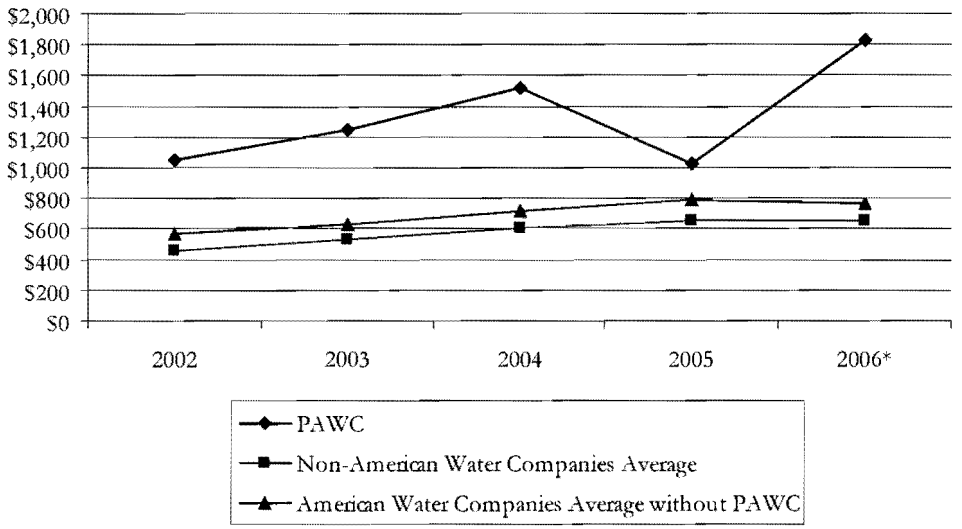
Customer Accounting Expenses per Million Gallons

Exhibit XIV-64
Customer Accounting Expenses per Million Gallons



Administrative & General Expenses per Million Gallons

Exhibit XIV-65
Administrative & General Expenses per Million Gallons



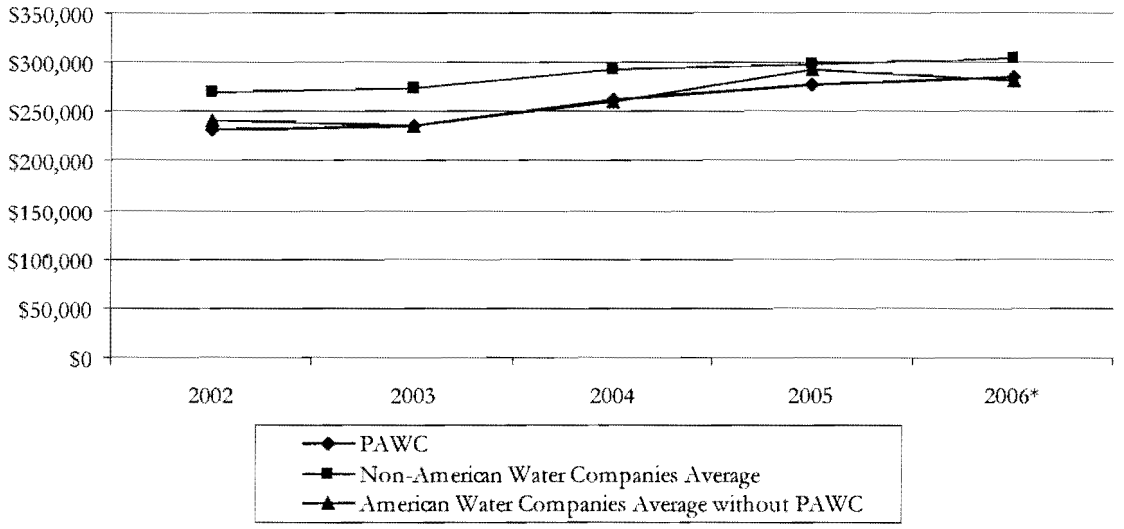
Operation and Maintenance Expenses per Thousand Customers

Exhibit XIV-66
Expenses per Thousand Customers

Performance Ratios	2002	2003	2004	2005	2006*	Compound Growth/Loss 2002-2006
Production Expenses per Thousand Customers (PAWC)	$12,727	$12,501	$11,058	$11,938	$9,054	-8.16%
Production Expenses per Thousand Customers (Non-American Water Companies Average)	$118,743	$113,936	$123,060	$122,495	$127,068	1.71%
Production Expenses per Thousand Customers (American Water Companies Average without PAWC)	$63,249	$53,927	$58,301	$69,022	$64,367	0.44%
Purificanon Expenses per Thousand Customers (PAWC)	$57,581	$58,871	$54,079	$55,377	$59,345	0.76%
Purification Expenses per Thousand Customers (Non-American Water Companies Average)	$28,283	$29,175	$27,763	$29,377	$29,444	1.01%
Purification Expenses per Thousand Customers (American Water Companies Average without PAWC)	$35,711	$40,643	$39,984	$49,658	$44,873	5.88%
Transmission & Distribution Expenses per Thousand Customers (PAWC)	$39,493	$37,829	$38,374	$38,836	$40,565	0.67%
Transmission & Distribution Expenses per Thousand Customers (Non-American Water Companies Average)	$33,985	$33,618	$35,843	$37,382	$37,733	2.65%
Transmission & Distribution Expenses per Thousand Customers (American Water Companies Average without PAWC)	$37,062	$36,448	$36,494	$33,431	$32,946	-2.90%
Customer Accounting Expenses per Thousand Customers (PAWC)	$29,018	$28,261	$31,772	$32,537	$29,628	0.52%
Customer Accounting Expenses per Thousand Customers (Non-American Water Companies Average)	$21,684	$21,168	$20,749	$19,836	$21,616	-0.08%
Customer Accounting Expenses per Thousand Customers (American Water Companies Average without PAWC)	$17,656	$18,199	$18,216	$17,913	$20,967	4.39%
Administrative & General Expenses per Thousand Customers (PAWC)	$91,680	$98,187	$127,171	$138,570	$146,005	12.34%
Administrative & General Expenses per Thousand Customers (Non-American Water Companies Average)	$67,687	$74,849	$84,893	$90,204	$88,528	6.94%
Administrative & General Expenses per Thousand Customers (American Water Companies Average without PAWC)	$87,862	$86,441	$106,673	$122,529	$117,126	7.45%
Total Operation & Maintenance Expenses per Thousand Customers (PAWC)	$230,499	$235,649	$262,454	$277,258	$284,596	5.41%
Total Operation & Maintenance Expenses per Thousand Customers (Non-American Water Companies Average)	$270,382	$272,746	$292,310	$299,293	$304,389	3.01%
Total Operation & Maintenance Expenses per Thousand Customers (American Water Companies Average without PAW	$241,551	$235,660	$260,552	$292,554	$280,278	3.79%

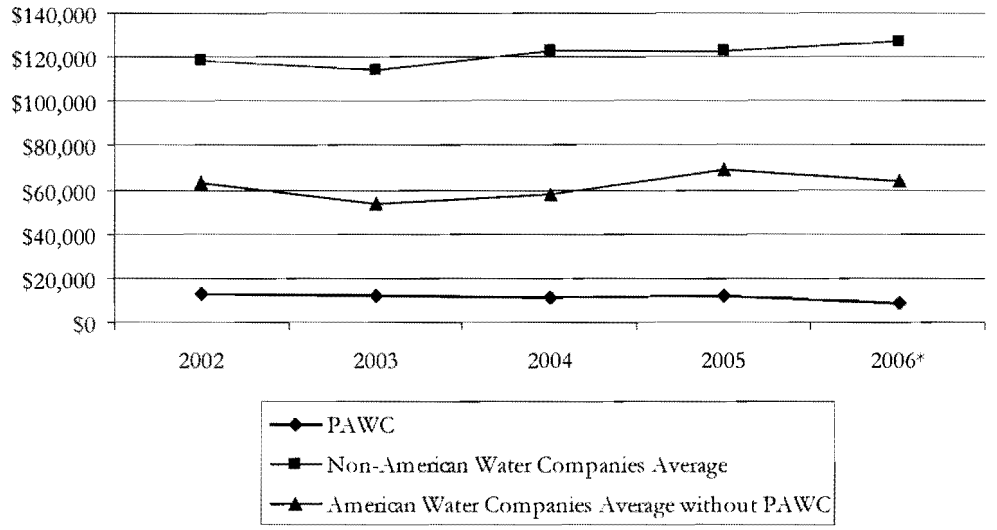
* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC

Total Operation & Maintenance Expenses per Thousand Customers



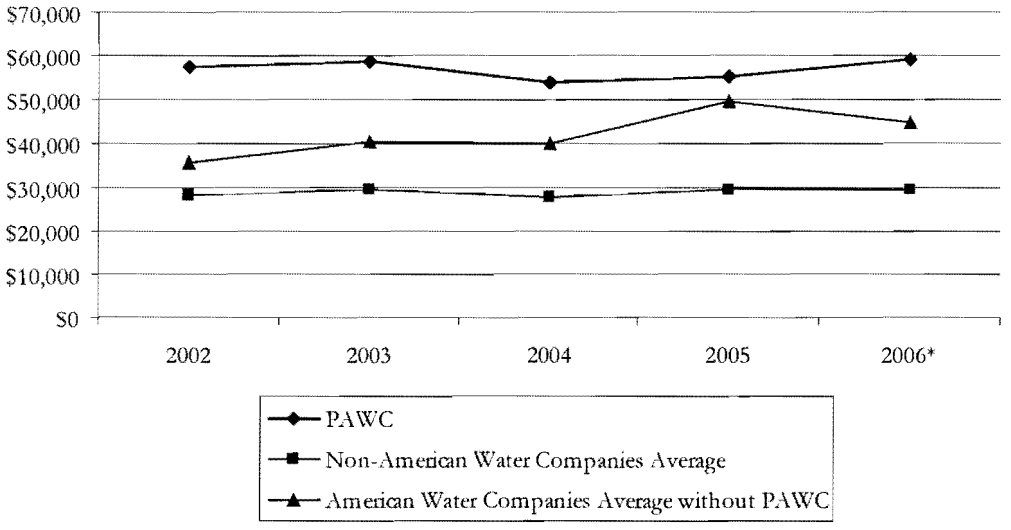
Production Expenses per Thousand Customers

Exhibit XIV-67
Production Expenses per Thousand Customers



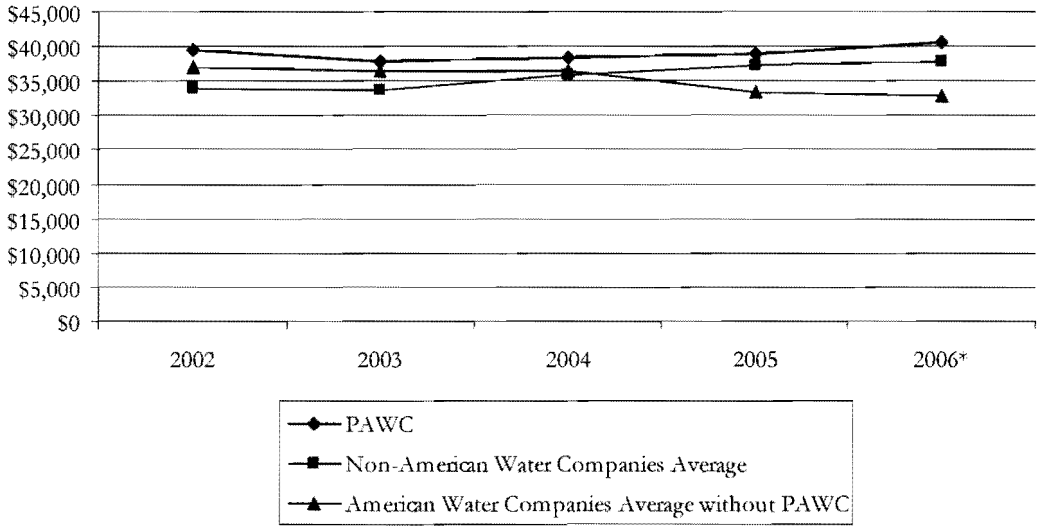
Purification Expenses per Thousand Customers

Exhibit XIV-68
Purification Expenses per Thousand Customers



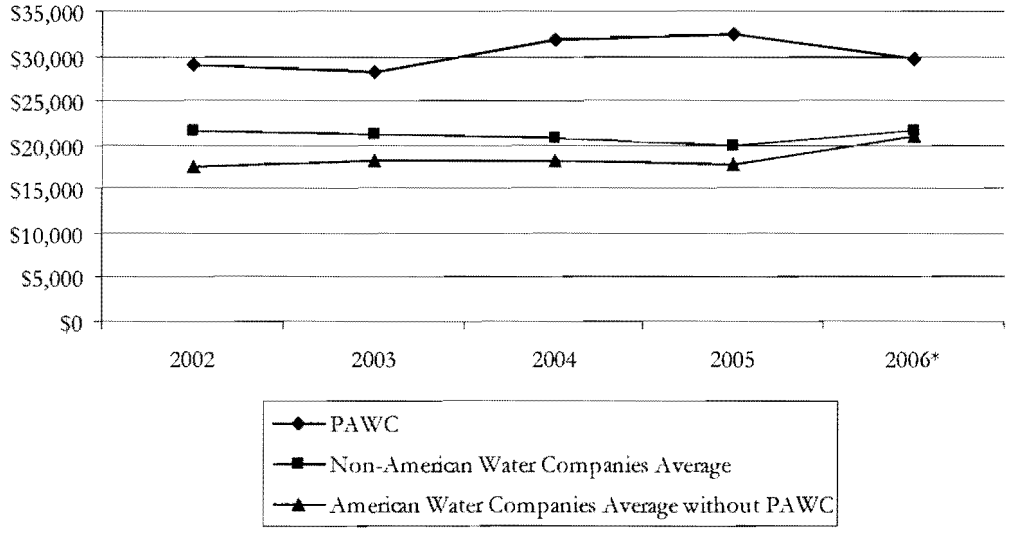
Transmission & Distribution Expenses per Thousand Customers

Exhibit XIV-69
Transmission & Distribution Expenses per Thousand Customers



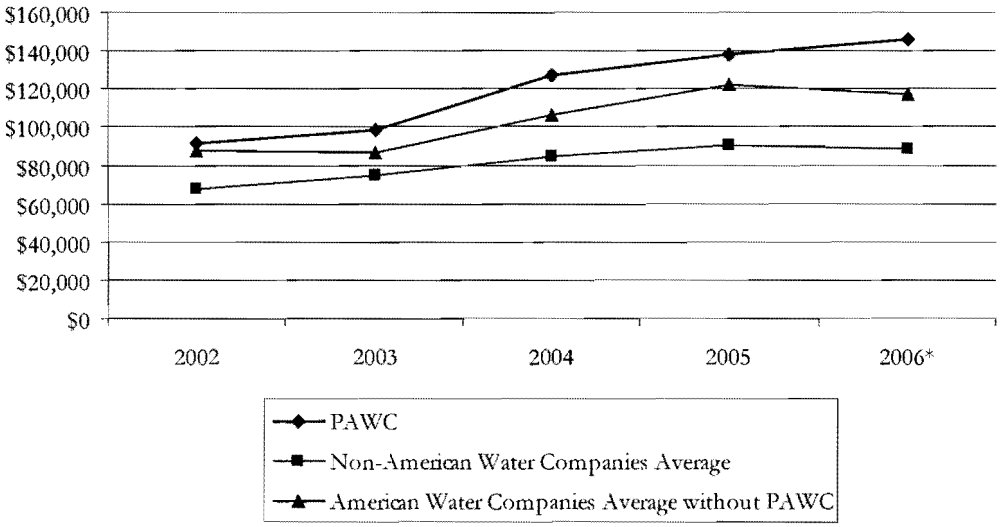
Customer Accounting Expenses per Thousand Customers

Exhibit XIV-70
Customer Accounting Expenses per Thousand Customers



Administrative & General Expenses per Thousand Customers

Exhibit XIV-71
Administrative & General Expenses per Thousand Customers



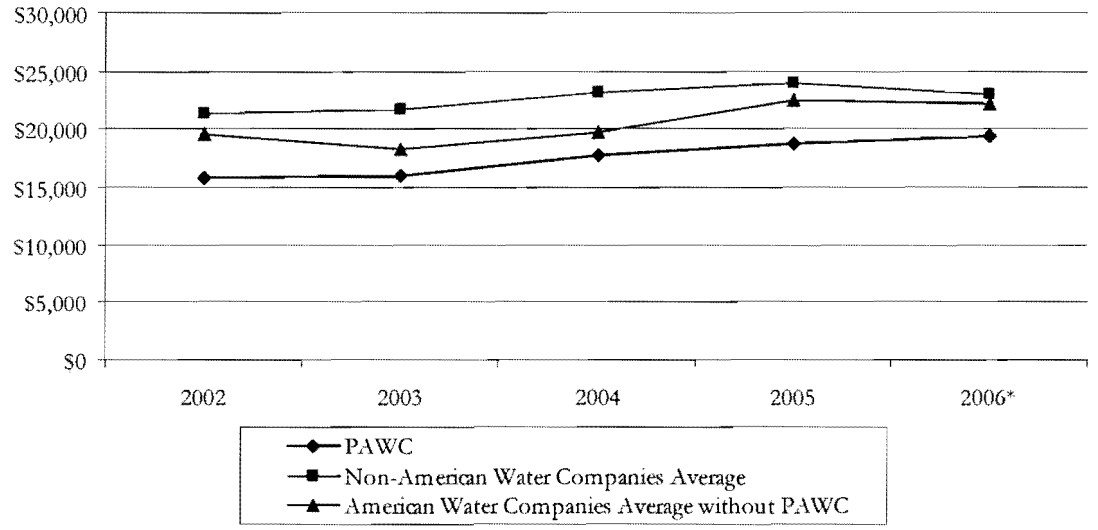
Operation and Maintenance Expenses per Mile of Main

Exhibit XIV-72
Expenses per Mile of Main

Performance Ratios	2002	2003	2004	2005	2006*	Compound Growth/Loss 2002-2006
Production Expenses per Mile of Main (PAWC)	$872	$851	$746	$810	$616	-8.31%
Production Expenses per Mile of Main (Non-American Water Companies Average)	$9,383	$9,047	$9,761	$9,790	$9,628	0.65%
Production Expenses per Mile of Main (American Water Companies Average without PAWC)	$5,130	$4,163	$4,429	$5,316	$5,106	-0.11%
Purification Expenses per Mile of Main (PAWC)	$3,945	$4,007	$3,647	$3,760	$4,039	0.59%
Purification Expenses per Mile of Main (Non-American Water Companies Average)	$2,235	$2,317	$2,202	$2,348	$2,231	-0.05%
Purification Expenses per Mile of Main (American Water Companies Average without PAWC)	$2,896	$3,138	$3,037	$3,825	$3,560	5.29%
Transmission & Distribution Expenses per Mile of Main (PAWC)	$2,706	$2,575	$2,588	$2,637	$2,761	0.50%
Transmission & Distribution Expenses per Mile of Main (Non-American Water Companies Average)	$2,686	$2,669	$2,843	$2,988	$2,859	1.58%
Transmission & Distribution Expenses per Mile of Main (American Water Companies Average without PAWC)	$3,006	$2,814	$2,772	$2,575	$2,614	-3.43%
Customer Accounting Expenses per Mile of Main (PAWC)	$1,988	$1,923	$2,143	$2,209	$2,016	0.35%
Customer Accounting Expenses per Mile of Main (Non-American Water Companies Average)	$1,714	$1,681	$1,646	$1,585	$1,638	-1.12%
Customer Accounting Expenses per Mile of Main (American Water Companies Average without PAWC)	$1,432	$1,405	$1,384	$1,380	$1,663	3.81%
Administration & General Expenses per Mile of Main (PAWC)	$6,281	$6,683	$8,577	$9,407	$9,936	12.15%
Administration & General Expenses per Mile of Main (Non-American Water Companies Average)	$5,349	$5,943	$6,734	$7,209	$6,708	5.82%
Administration & General Expenses per Mile of Main (American Water Companies Average without PAWC)	$7,126	$6,674	$8,103	$9,438	$9,292	6.86%
Total Operation & Maintenance Expenses per Mile of Main (PAWC)	$15,791	$16,039	$17,702	$18,823	$19,368	5.24%
Total Operation & Maintenance Expenses per Mile of Main (Non-American Water Companies Average)	$21,366	$21,657	$23,186	$23,920	$23,064	1.93%
Total Operation & Maintenance Expenses per Mile of Main (American Water Companies Average without PAWC)	$19,591	$18,194	$19,791	$22,534	$22,235	3.22%

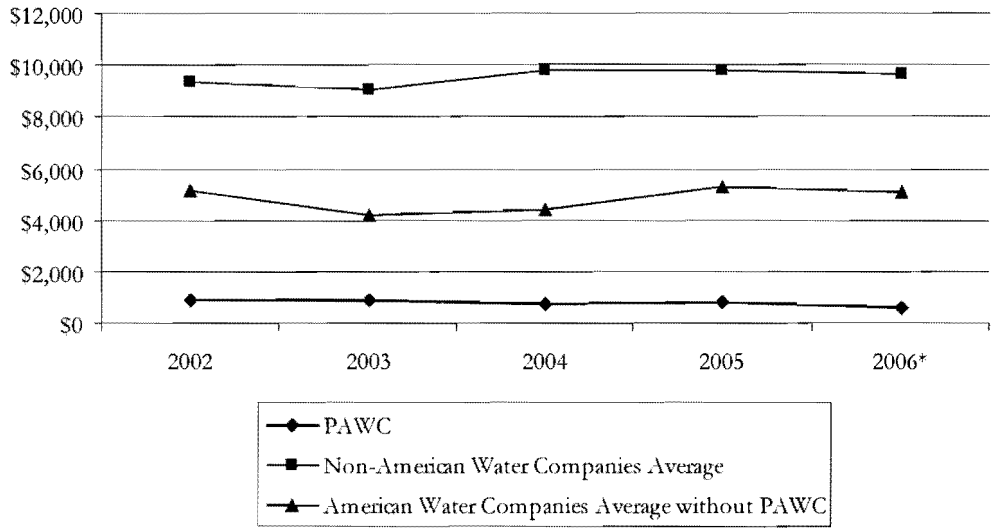
* 2006 Elizabethtown Water, New Jersey American, and PAWC data from Data Request 620 response, not NAWC

Total Operation & Maintenance Expenses per Mile of Main



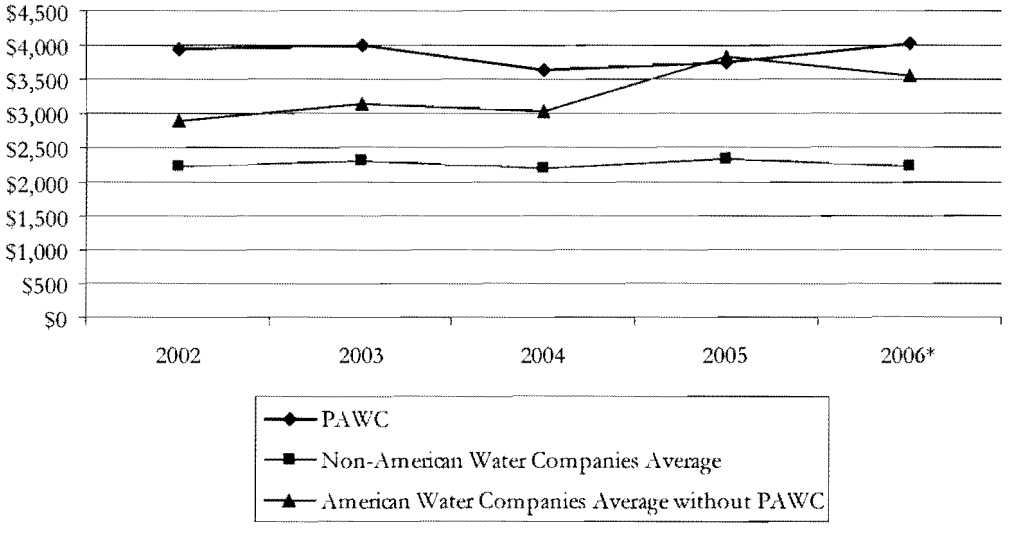
Production Expenses per Mile of Main

Exhibit XIV-73
Production Expenses per Mile of Main



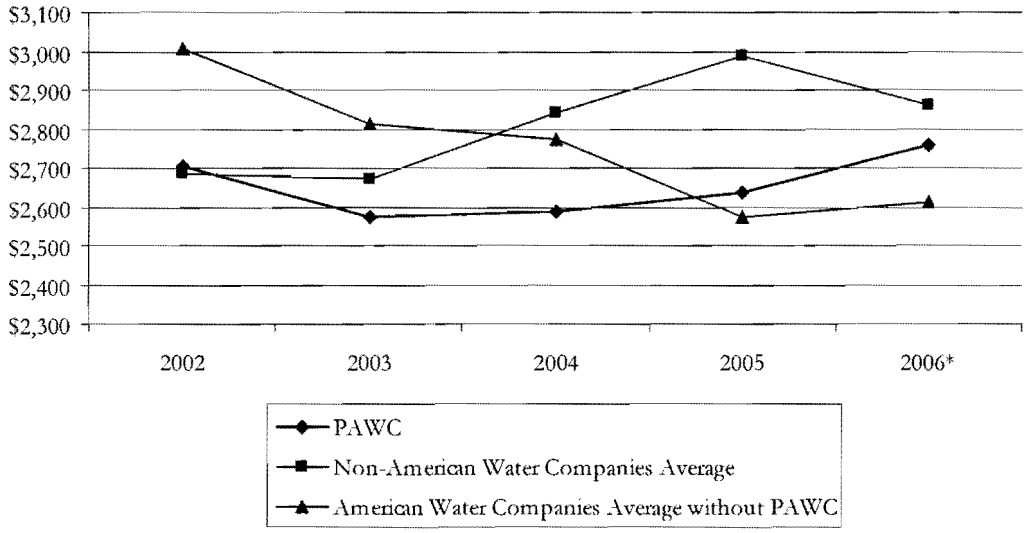
Purification Expenses per Mile of Main

Exhibit XIV-74
Purification Expenses per Mile of Main



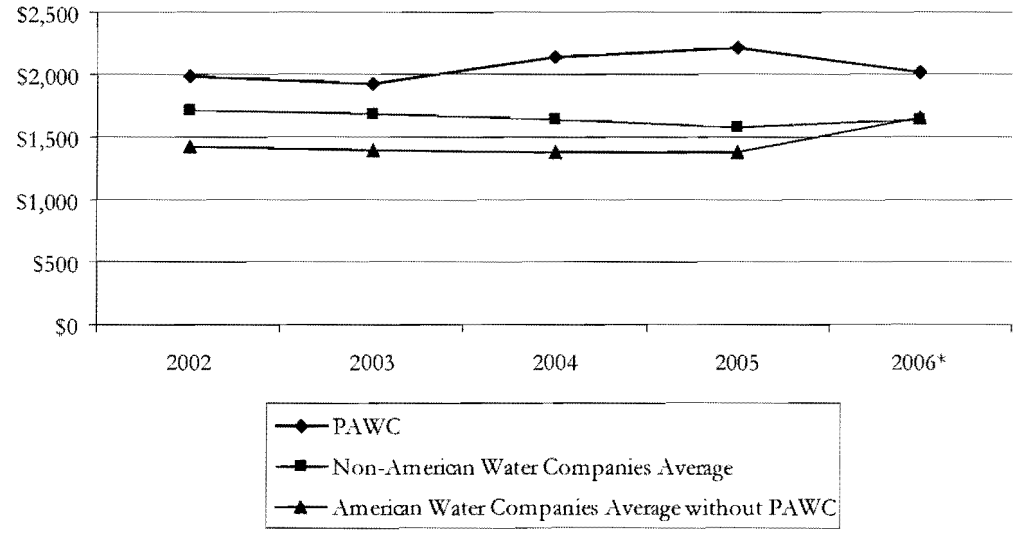
Transmission & Distribution Expenses per Mile of Main

Exhibit XIV-75
Transmission & Distribution Expenses per Mile of Main



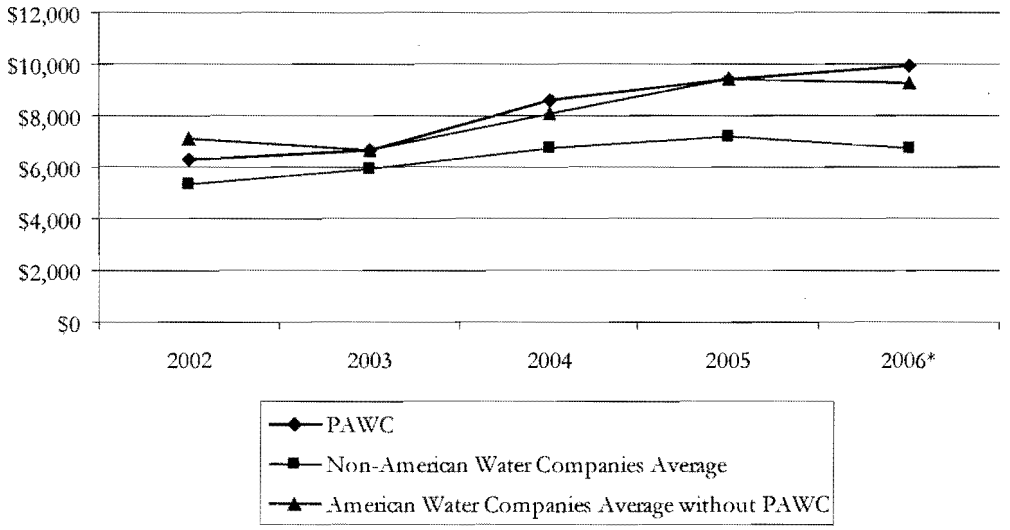
Customer Accounting Expenses per Mile of Main

Exhibit XIV-76
Customer Accounting per Mile of Main



Administrative & General Expenses per Mile of Main

Exhibit XIV-77
Administrative & General Expenses per Mile of Main



XV. Appendix B: Glossary

A.

Item	Acronym	Description
accounts receivable aging	ARA	
Account Resolution Team	ART	
active directory	AD	
active leak control	ALC	
Activity Report	AR	
advanced metering system	AMS	
affirmative action plan	AAP	
American Bankers Association	ABA	
American Carbon Services	ACS	
American Water Capital Corporation	AWCC	
American Water Commercial Development Committee	AWCDC	
American Water Enterprises	AWE	
American Water Resources	AWR	
American Water Works Association	AWWA	
American Water Works Company	AWWC	
American Water Works Association Research Foundation	AWWARF	
American Water Works Service Company	AWWSC	
application service provider	ASP	
Applied Water Management	AWM	
automatic call distributor	ACD	
automatic meter reading	AMR	
automobile liability	AL	
Automotive Resources International	ARI	

B.

Item	Acronym	Description
best operating practice	BOP	
Bureau of Labor Statistics	BLS	
Business Application Support Specialist	BASS	
business continuity plan	BCP	
business opportunity form	BOF	
Business Performance Package	BPP	
business process reengineering	BPR	
business unit	BU	

C.

Item	Acronym	Description
Call Management Systems	CMS	
capital expenditures	CAPEX	
Capital Investment Management	CIM	
Capital Investment Management Committee	CIMC	
central meter reading	CMR	
central processing unit	CPU	
central standard time	CST	
Certified Fraud Examiner	CFE	
Certified Information System Auditor	CISA	
Certified Internal Auditor	CIA	
Certified Management Accountant	CMA	
Certified Public Accountant	CPA	
Change Approval Board	CAB	
Change Partner Network	CPN	
Chief Diversity Officer	CDO	
Chief Executive Offi	CEO	
Chief Financial Officer	CFO	
Chief Growth Officer	CGO	
Chief Information Officer	CIO	

Item	Acronym	Description
Chief Operating Officer	COO	
Client Services & Support	CS&S	
Code of Ethics	COE	
Collision Experts, Inc	CEI	
Commercial Development Committee	CDC	
commercially off-the-shelf	COTS	
Committee of Sponsoring Organizations	COSO	
computer maintenance management system	CMMS	
Computer Sciences Corporation	CSC	
construction work in progress	CWIP	
consumer price index	CPI	
Corporate Counsel	CC	
Customer Assistance Program	CAP	
Customer Contract Council	CCC	
Customer Service Center	CSC	
customer service representative	CSR	

D.

Item	Acronym	Description
days payable outstanding	DPO	
Department of Environmental Protection	DEP	
direct access storage device	DASD	
directors and officers	D&O	
disabled veteran business enterprise	DVBE	
disaster recovery plan	DRP	same acronym as distribution resources planning
distribution resources planning	DRP	same acronym as disaster recovery plan
district metering area	DMA	

E.

Item	Acronym	Description
earnings before interest and taxes	EBIT	
earnings before interest, taxes, depreciation, and amortization	EBITDA	
Electronic Customer Information System	E-CIS	
electronic funds transfer	EFT	
Employment Opportunity & Training Center	EOTC	
end of year	EOY	
enterprise resource planning	ERP	
enterprise risk management	ERM	
Environmental Protection Agency	EPA	
equal employment opportunity	EEO	
Equal Employment Opportunity Commission	EEOC	
Executive Management Team	EMT	
Executive Resolution Team	ERT	
Executive Vice President	EVP	

F.

Item	Acronym	Description
Family Medical Leave Act	FMLA	
fiber to the premise	FTTP	
Field Resource Coordination Center	FRCC	
Financial Planning & Analysis	FP&A	
Financial Reporting Package	FRP	
fiscal year	FY	
fixed assets	FA	
Fixed Utility Services	FUS	
full time equivalent	FTE	

G.

Item	Acronym	Description
General Counsel	GC	
General Electric	GE	
general liability	GL	
Generally Accepted Auditing Standards	GAAS	
geographic information system	GIS	
global positioning system	GPS	
granular activated carbon	GAC	
gross vehicle weight	GVW	

H.

Item	Acronym	Description
heating/venting/air conditioning	HVAC	
Human Resources	HR	
Human Resources Information System	HRIS	

I.

Item	Acronym	Description
identity access management	IAM	
independent auxiliary storage pod	IASP	
information technology	IT	
Information Technical Review Board	ITRB	
Information Technology Services	ITS	
infrastructure leakage index	ILI	
initial public offering	IPO	
Institute of Internal Auditors	IIA	
integrated cash management system	ICMS	
integrated file system	IFS	
interactive voice response	IVR	

Item	Acronym	Description
Internal Audit	IA	
International Association for Continuing Education & Training	IACET	
International Customer Management Institute	ICMI	
International Water Association	IWA	
IT Steering Committee	ITSC	

J.

Item	Acronym	Description
JD Edwards	JDE	

K.

Item	Acronym	Description
key performance indicator	KPI	

L.

Item	Acronym	Description
Letter Generation System	LGS	
long term disability	LTD	
Loss Control Manager	LCM	
lost work-day case	LWDC	

M.

Item	Acronym	Description
Master of Business Administration	MBA	
Michigan-American Water Company	MAWC	
minority business enterprise	MBE	
mobile automatic meter reading	M-AMR	

N.

Item	Acronym	Description
National Association for the Advancement of Colored People	NAACP	
National Association of Securities Dealers	NASD	
National Association of Water Companies	NAWC	
National Minority Supplier Development Council	NMSDC	
New York Stock Exchange	NYSE	
non-revenue water	NRW	
non-sufficient fund	NSF	

O.

Item	Acronym	Description
Occupational Safety & Health Administration	OSHA	
Office of Risk Management	ORM	same acronym as Operations Risk Management
operations and maintenance	O&M	same acronym as operations and management
operations and management	O&M	same acronym as operations and maintenance
Operations Risk Management	ORM	same acronym as Office of Risk Management
Opinion Research Corporation	ORC	
organization capability review	OCR	

Item	Acronym	Description
organization development	OD	
other post-employment benefits	OPEB	

P.

Item	Acronym	Description
Pennsylvania-American Water Company	PAWC	
Pennsylvania Infrastructure Investment Authority	PENNVest	
Pennsylvania Public Utility Commission	PaPUC	
personal computer	PC	
Personnel Decisions International	PDI	
point of presence	POP	
portable document format	PDF	
PowerPlant	PP	
pressure relief valve	PRV	
preventive maintenance	PM	
PricewaterhouseCoopers	PwC	
profit and loss	P&L	
Project Management Body of Knowledge	PMBOK	
Project Management Institute	PMI	
project management office	PMO	
Project Management Professional	PMP	
Project Steering Committee	PSC	
property	PR	
property damage	PD	
Public Company Accounting Oversight Board	PCAOB	
public utility commission	PUC	
Public Utility Realty Tax Act	PURTA	
public water system identified	PWSID	
purchase order	PO	

Q.

Item	Acronym	Description
quality assurance	QA	

R.

Item	Acronym	Description
Real View Imaging	RVI	
Regional Associate Counsel	RAC	
Regional General Counsel	RGC	
Regional Investment Management Committee	RIMC	
request for proposal	RFP	
request for quote	RFQ	
return on investment	ROI	
Risk Management Committee	RMC	
Risk Operations Management Committee	ROMC	
RWE AG	RWE	

S.

Item	Acronym	Description
Safe Drinking Water Act	SDWA	
Sarbanes-Oxley	SOX	
Securities and Exchange Commission	SEC	
Senior Vice President	SVP	
service level agreement	SLA	
Shared Services Center	SSC	
short term disability	STD	
Southeast Region	SER	
Strategic Capital Expenditure Plan	SCEP	
subject matter experts	SME	
supervisor control and data acquisition	SCADA	

Item	Acronym	Description
Supply Chain	SC	
Supplier Complaint Report	SCR	

T.

Item	Acronym	Description
Tennessee Valley Authority	TVA	
third-party administrator	TPA	
training and development	T&D	
turn-around-time	TAT	

U.

Item	Acronym	Description
unaccounted-for-water	UFW	
unavoidable leakage	UL	
unavoidable real losses	UARL	
uniform system of accounts	USOA	
user acceptance testing	UAT	
user access request	UAR	

V.

Item	Acronym	Description
vector directory number	VDN	
Vice President	VP	
virtual machine	VM	
voice over Internet protocol	VoIP	

W.

Item	Acronym	Description
Water Loss Control Committee	WLCC	
West Allegheny County Municipal Authority	WACMA	
women business enterprise	WBE	
women minority and disabled veterans business enterprise	WMDVBE	
work experience questionnaire	WEQ	
Workers' compensation	WC	
work order	WO	

X.

Item	Acronym	Description

Y.

Item	Acronym	Description
Year 2000	Y2k	
year-to-date	YTD	

Z.

Item	Acronym	Description

From: Reed, Jeffrey
Sent: Wednesday, October 28, 2009 3:11 PM
To: Daniels, Sandy
Subject: FW: Filing accepted.

-----Original Message-----
From: donotreply@urc.in.gov [mailto:donotreply@urc.in.gov]
Sent: Wednesday, October 28, 2009 11:14 AM
To: Reed, Jeffrey
Subject: Filing accepted.

Cause No:43680
SubDocket No:NONE
File Type:CASE
Filing Party Name:Jeffrey Reed
Filing Party Email:jreed@oucc.in.gov
Date/Time Filed:10/27/2009 4:27:31 PM
FileName:jreed_43680 IN-American - OUCC Testimony Vol 7_102709_10_27_20094-27-31PM.pdf

From: Reed, Jeffrey
Sent: Tuesday, October 27, 2009 4:28 PM
To: Daniels, Sandy
Subject: FW: File Uploaded Successfully

-----Original Message-----
From: donotreply@urc.in.gov [mailto:donotreply@urc.in.gov]
Sent: Tuesday, October 27, 2009 4:28 PM
To: Reed, Jeffrey
Subject: File Uploaded Successfully

Your file has been uploaded successfully and is in the process of verification.
Tracking Number:8a826ce8f317
Party Name:OUCC
File Type:Filings in Docketed Cases
Filing Party Name:Jeffrey Reed
Filing Party Email:jreed@oucc.in.gov
Date/Time Filed:10/27/2009 4:27:31 PM
Cause Number:43680
Sub Docket Number:NONE
FileName:jreed_43680 IN-American - OUCC Testimony Vol 7_102709_10_27_20094-27-31PM.pdf